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Preliminary Coastal Plan

HEARING DRAFT, MARCH 1975

CALIFORNIA COASTAL ZONE CONSERVATION COMMISSIONS

GB
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1975

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EDMUND G. BROWN, JR., Governor

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March 6, 1975

TO THE PEOPLE OF CALIFORNIA:

On November 7, 1972, the voters of California approved the Coastal Initiative (Proposition 20) and the California Coastal Zone Conservation Commissions came into existence.

The Commissions—one statewide and six regional—were directed to prepare a plan for the future of the California coast, and to regulate coastal development temporarily, while the plan was being prepared.

This report contains the Preliminary Coastal Plan. It has been developed through the work of the seven Coastal Commissions, helped by thousands of Californians who have reviewed draft proposals, attended informational forums, and testified at hearings on the various Plan elements.


Now we seek your help in reviewing the Preliminary Plan. You may send comments in writing, and you may testify at public hearings that will be held this spring and summer. We are enclosing in this report a leaflet listing the hearing schedule; if your report does not contain the leaflet, please write or call the Commission offices listed on pages 5-8, for a copy.

We particularly seek your views on two things:

--The Plan itself, with its recommendations for use and protection of the California coast.

--The most effective governmental means for carrying out the Coastal Plan; we thus seek your evaluation of the alternatives listed in Part III of this report.

The Coastal Commissions must adopt their final recommendations this summer and fall, for presentation to the Governor and the Legislature in December 1975. This means that the Commissions must complete their work under a very tight deadline, and we therefore seek your response to the Preliminary Plan as soon as possible.


M. B. LANE
Chairman

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Commissioners[†]

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[†]This list includes all commissioners who have served since establishment of the California Coastal Zone Conservation Commissions, with asterisks (*) denoting past Commissioners. Abbreviations following the names of public representatives show the appointing authority: G—Governor, S—Senate Rules Committee, A—Speaker of the Assembly.

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Part I: Summary and Introduction

Summary

The coast of California--the communities, lands, and waters that mark the western end of the American continent--is in danger.

In 1972 the voters of California decided to set a new direction for coastal use and protection. In adopting the Coastal Initiative (Proposition 20), the people of California said:

"The permanent protection of the remaining natural and scenic resources of the coastal zone is a paramount concern to present and future residents of the state and nation;" and

"It is the policy of the state to preserve, protect, and where possible, to restore the resources of the coastal zone for the enjoyment of the current and succeeding generations."

But the Coastal Initiative did not provide a permanent solution; rather, it established temporary Commissions to plan for the future of the coast and to temporarily control development. Under present law, the Coastal Commissions will go out of existence at the end of 1976.

What will happen then?

One possibility is a return to the wasteful, piecemeal, sprawling kind of development that has already overrun many once-open parts of the coast, and to the overdevelopment in some coastal cities that has congested local streets and walled off coastal vistas from all but those fortunate enough to live on the immediate oceanfront.

Another possibility, the one recommended in this Coastal Plan, is for the people of California to protect the unique qualities of the coast, both in cities and in rural areas, and to guide coastal use and development accordingly.

The Coastal Plan presented in this report recognizes that the coast must serve the varied needs of today, but the Plan also recognizes that unless development is guided to protect the special resources of the coast, we may well deprive our children and grandchildren of the coastal values we cherish today.

Thus, the people of California can, in the bicentennial year of 1976, choose the future of the coast: shall it be abused, degraded, its splendor eroded, or shall it be used intelligently, with its majesty and productivity protected for future generations?

WHAT THE COAST IS

The California coast is many things, along its nearly 1,100 miles of land and water, from the foggy redwood forests of the north to the sun-baked palm trees of the south.

The coast is a place for hundreds of thousands of Californians to escape the heat of the city on a summer day. But they often face a frustrating traffic jam trying to get to the beach, and they may find no place to park when they do arrive.

The coast is a special combination of climate, soil, and ocean breeze that is uniquely valuable for many crops: trees, artichokes, flowers, brussels sprouts, etc. But high taxes and the pressures of the expanding city threaten agricultural land and, as happened in so many other places in California, irreplaceable farm land may be paved over for housing.

The coast is a neighborhood near the water, where you can walk to a nearby beach or to a bluff to see the ocean surf. But coastal neighborhoods can be overrun by incompatible development. Land values may become so high that there is little chance to preserve small homes and family neighborhoods; older homes that could be renovated may instead be torn down, to be replaced by bigger and usually more expensive condominium buildings.

The coast is a small lot on the ocean, a place to build your home and retire. But if too many other people do the same thing, you won't have a quiet, isolated place; you'll find your ocean view blocked by another building, your roads and highways crowded.

The coast is a sought-after place to put power plants, offshore oil rigs, onshore refineries, and moorings for supertankers. But there is great controversy about where they should be, what the environmental risks are, and who should make the ultimate decisions about whether or not to allow them.

The coast is the nearshore ocean waters that provide fish of great value for sportsmen and for food supply. But overfishing, destroying coastal wetlands, and using the ocean to dispose of polluting wastes diminishes the bountiful marine life along the California coast.

The coast is a place to surf, to fish, to swim, to go boating, to sunbathe, to picnic, to bicycle, to study tide pools, to look for rocks and shells, to play volleyball, to walk, to sit, to gaze—in short, to play, and sometimes simply to enjoy the inspiration and serenity the coast can provide.

A CONSTITUTION FOR THE COAST

No single plan can foresee all the problems or provide all the answers for the future of the California coast. But this plan recommends basic rules to govern use and protection of the coastal zone now and in the future, and the plan will, in its final version, recommend governmental means to enforce its policies and keep them current as circumstances change.

The Plan is, in short, intended to be a constitution for the coast.

The Coastal Plan is designed to achieve two objectives:

1. Protect the California coast as a great natural resource for the benefit of present and future generations.
2. Use the coast to meet human needs, but in a manner that protects the irreplaceable resources of coastal lands and waters.

MAJOR FINDINGS AND RECOMMENDATIONS OF THE COASTAL PLAN

The essence of the Plan is that the coast should be treated not as ordinary real estate but as a unique place, where conservation and special kinds of development should have priority. The Plan's foundation is the fact that coastal resources are limited, and that meeting human needs while protecting the coast will require policies such as the following:

Public Use of the Coast. Public access to appropriate coastal areas should be provided. Coastal developments that serve the public--such as campgrounds, resorts, hotels and motels, rental housing, etc.--should have priority over coastal developments that are essentially private, such as typical residential developments.

Wetlands. Coastal marshes and other wetlands, many of which have been filled and diked in past years, should be protected from further destruction and restored where possible.

Agricultural Lands. Coastal lands suitable for agricultural production should be kept in agriculture, and tax policies should be changed to reduce pressures to convert such land to urban development.

Coastal Streams. Free-flowing coastal streams should be protected, because they are necessary for the migratory fish caught by commercial and sport fishermen and because they supply sand for coastal beaches.

Energy. The use of increasing amounts of coastal land and water to meet energy needs should be reduced by a vigorous program of energy conservation. Energy installations allowed on the coast must be subject to stringent environmental safeguards.

Transportation. Public transit should receive priority over roadway construction in urban areas, to reduce the need for coastal parking lots and major highway programs, to conserve energy, and to improve coastal air quality.

Hazards to Development. Development should be permitted in hazardous areas, such as those subject to beach or cliff erosion, landslides, earthquakes, and flooding, only if adequate engineering can reduce the hazards to acceptable levels.

Public Recreation. Public recreation should have the highest priority in suitable areas of the coast, and legal rights of the public to have access to publicly-owned tidelands should be vigorously enforced. Public use of coastal lands and waters should be consistent with natural resource protection.

Concentrated Development. Where substantial new development would harm coastal resources and restrict public access to the oceanfront, new development should be channeled to the inland parts of coastal cities and to other inland areas. Public investment in roadways, water systems, sewer systems, and other such installations should be designed to concentrate development in existing communities (consistent with their ability to absorb it) and thus to end wasteful, sprawling development along the coast.

Governmental Actions. The plans and operations of many Federal, State, and local agencies should be reviewed to better protect coastal resources.

CARRYING OUT THE PLAN

This Preliminary Plan makes no specific recommendations as to how the Plan should be carried out, i.e., what governmental organization, powers, and funding are needed. Part III of this report evaluates several alternatives. The Plan as finally adopted for submission to the Governor and the Legislature will include specific recommendations for carrying out the Plan.

PLANNING AT A TIME OF RAPID CHANGE

In the spring of 1975, as this Coastal Plan is being prepared, Californians are increasingly aware that the postwar era of seemingly-endless abundance may be coming to an end. People know that natural resources are limited, that inflation is in part caused by wasteful use of land and other finite resources, that prime agricultural lands needed to feed the world's growing population should not be squandered on development that can be built elsewhere, and that the increasing costs of energy and of raw materials may result in major changes in the lives of Californians.

Moreover, there is increasing recognition that no society can long survive if it dissipates its resources recklessly, and that wasteful use of land and water is bound to be costly in the long run. Although it may be expensive to protect coastal resources, it may be even more expensive not to. The cost will come not only in the health hazards of polluted air and water, not only in the higher food, housing, and transportation costs that result from poor use of land and sprawling development, but also a diminished overall quality of life.

No plan can deal with every possible event that might occur over a period of many years, particularly if the years are ones of rapid change. But the Coastal Plan is designed to be just as useful during a time of scarcity as during a time of abundance: in either case, the careful use of limited coastal resources is essential if the coast is to be protected for future generations.

Introduction

The Preliminary Plan has four Parts:

--Part I, Summary and Introduction (this section) summarizes the Plan and introduces the rest of the sections. This part also includes a summary map showing major coastal resources: climate, watersheds, agricultural lands, etc. This map also shows the coastal zone as described in the Coastal Act (Proposition 20), copies of which are available in each Commission office. And the map shows the proposed inland boundary line for future definition of the coastal zone as recommended by the Regional Commissions (these lines are shown in more detail on the Plan Maps in Section IV); this line is intended to define the inland extent of major coastal resources.

--Part II is Findings and Policies for the many aspects of coastal protection and development. Draft findings and policies on each of the Plan elements were the subject of public hearings by the Regional and State Commissions. Findings and recommendations adopted by each Regional Commission were combined for adoption by the State Commission; in some cases, decisions had to be made with regard to conflicting recommendations, so some Regional Commission recommendations are not included in this draft plan. In addition, some of the adopted recommendations were submitted by only one or two Regional Commissions and thus were not widely discussed by all of them. The findings and policies in Part II are thus as they were adopted by the State Commission for inclusion in this Preliminary Plan; they have been changed only to clarify language and eliminate repetition. A small amount of new material has been added, as explained in Note 3 below.

--Part III, Carrying Out the Plan, evaluates different ways in which governmental agencies could carry out the Coastal Plan.

--Part IV, Plan Maps, illustrates how the Coastal Plan policies could be applied in each part of the coast. The maps were prepared by the six Regional Commissions to show how the policies might apply to specific coastal areas. These maps have not yet been reviewed by the State Commission; some revisions may be needed to bring the maps into full agreement with statewide policies, or the policies may in turn need to be revised.

In reading the Plan, please keep in mind the following definitions and notes:

1. Statewide Findings and Policies. In Part II, the findings and recommended policies are of statewide application.
2. Regional Applications of Policies. Application of these statewide policies to the diverse conditions of different coastal areas is shown in two ways: as regional amplifications in the text following the statewide policies, and in the notations on the Plan Maps in Part IV.

The six coastal regions established by the Coastal Act are:

- North: Del Norte, Humboldt, and Mendocino Counties
- North Central: Sonoma, Marin, and San Francisco Counties
- Central: San Mateo, Monterey, and Santa Cruz Counties
- South Central: San Luis Obispo, Santa Barbara, and Ventura Counties
- South: Los Angeles and Orange Counties
- San Diego: San Diego County

3. New Material. Almost all the material in Part II is findings and policies adopted by the State Commission for the Preliminary Plan (except that Plan Element 8, Intensity of Development, received only informal approval from the State Commission pending formal hearing and adoption after the Preliminary Plan went to press). Based on rewriting for clarity or new information, however, some additional material has been included for public review. Both new material and extensively revised material are marked by a vertical bar in the left margin, as shown.
4. Disposition of Plan Elements. The Plan elements as adopted by the State Commission have been combined and organized for clarity; a bracketed key in the Part II text indicates the original finding or policy number. The abbreviations are few and simple:

f = finding
p = policy
RA = Regional Amplification
M = Marine Environment Element
L = Coastal Land Environment
G = Geology
R = Recreation
A = Appearance and Design
E = Energy
T = Transportation
I = Intensity of Development

For example, [E-pl5b] means the language came from Energy policy 15(b).
[R-p2RA] means it was a Regional Amplification of Recreation policy 2.

5. Use of "shall" and "should." Some of the recommended policies in Part II are intended for the agency designated to carry out the Coastal Plan; for these, "shall" is used--the coastal agency shall protect coastal wetlands. Other policies are intended for other governmental agencies; for these, "should" is used--the Governor and the Legislature should act at once to protect all prime agricultural land.
6. "Public Interest in the Coastal Zone" and "Ecological Planning Principles." The Preliminary Plan includes all of the components required by the Coastal Zone Act of 1972 with the possible exception of "a precise, comprehensive definition of the public interest in the coastal zone" and a statement of "ecological planning principles and assumptions to be used in determining the suitability and extent of allowable development." These appear to be fully covered by the Preliminary Plan itself, and time has not allowed for them to be drafted as separate sections; this could, however, be done for hearing and inclusion in the final Coastal Plan.
7. Additional Regional Plans and Reports. The policies and maps in the Coastal Plan, as revised from this Preliminary Plan and then adopted, are intended to be the principal guide to future conservation and development of the California coastal zone. In many instances, more detailed interpretation and application of these policies has been done, or is now being researched, by the Regional Commissions. These Regional studies and publications are of great help in understanding how broad policies are to be applied to specific conditions; there may, however, be some cases in which Regional proposals are in conflict with statewide policies, and efforts to resolve any such conflicts will be made as the Commissions' planning proceeds.



Part II: Findings and Policies

Marine Environment

Ocean Resources Management

FINDINGS

Marine Resources Are Essential. Marine resources are an essential element of this global environment. The sea provides man with food, income, education and research opportunities, recreation, and inspiration. The value of the sea as a source of food is important and will become more so in the future. Coastal waters are at least four times as productive as the open ocean. Even though the waters over the continental shelves comprise only 10 per cent of the world's ocean surface, 90 per cent of the world's fisheries are concentrated in this zone. [M-f1,2]

California's Coast Is Especially Productive. The California coastal marine environment is among the most productive in the world, enhanced as it is by: (1) a rugged sea bottom that offers a diversity of habitats, thus helping increase life productivity; (2) wind and current patterns which cause upwelling of nutrient-rich deep water to surface layers; (3) kelp beds that support an abundant variety of life; (4) rocky tide pools and intertidal areas, which sustain many unique and essential species; and (5) estuaries and wetlands that are among the world's most productive living systems. [M-f2]

Human Activities Affect Marine Resources. The intimate details of the nature and diversity of living resources of the sea are not yet fully understood nor are the impacts of human activities immediately apparent, but it is clear that marine resources are profoundly influenced by many human uses of the marine ecosystem. Pollution of water, over-exploitation of fish stocks, and destruction of habitat areas all diminish the opportunity of people to benefit from the economic, recreational, and other values of marine resources. Significant opportunities exist not only to protect but to restore the natural productivity of the marine environment as a renewable resource. [M-f1]

Rugged Sea Bottom Is One Factor in Productivity. The sea bottom along the California coast sustains high biological productivity. Twenty-seven submarine canyons exert significant biological and geological controls over the continental shelf by serving as conduits for transmission of nutrient-rich deep water to the inshore environment. Underwater ridges, banks, mountains, and scattered islands may also cause turbulent mixing in the water column by modifying currents and waves, thus enhancing the productivity of the sunlit zones of the water where life-sustaining photosynthesis occurs. These topographic features also provide unique habitat areas and spawning grounds. [M-f3]

Kelp Beds Also Contribute Greatly to the Coast's Productivity. Kelp beds or forests are a significant marine resource, contributing to the high biological productivity of California's marine environment. Kelp beds serve as sanctuaries, nurseries, habitats, and food sources for so many species that they support a greater variety of plants and animals than a temperate land forest. The kelp's great "biomass" (the amount of living matter per unit area) provides food and shelter and makes available an abundance of living matter to the surrounding sea. Kelp is usually found in rocky coastal environments where water

depth is about 25 to 80 feet. Kelp is fast growing and is a source of many products useful and valuable to people, such as thickeners and stabilizers in foods and cosmetics, additives in medicine, and industrial products. In San Diego, for example, the value of kelp harvested in 1972 was estimated at over \$500,000, and the market value of products derived from the harvest at ten times that amount. Kelp also tends to dissipate wave action, thus retarding wave erosion processes. [M-f4]

Some Human Activities Have Caused Kelp Bed Losses. Although California's kelp beds vary radically over time in response to natural changes in ocean water temperature and currents, they appear to have declined since the turn of the century from about 100 to 75 square miles. Some of this reduction is attributable to human activities with several possible causes: sewage discharges that smother the sea bottom, reduce water clarity needed for photosynthesis, and may contribute to a rise in the population of sea urchins that feed on kelp; exploitation of the sea otter population (a natural predator of the sea urchin); thermal waste discharges that may raise the water temperature beyond the plant's point of tolerance; or toxic discharges such as DDT and heavy metals. Regulated harvesting of kelp does not appear to have been detrimental. Through a program of controlled harvesting, augmented by restoration efforts based upon appropriate research and observation, natural growth (at least of the giant kelp species) can sustain continued harvest. [M-f5] Despite kelp's unique role in the productivity of the coastal environment, no kelp interpretive center exists to contribute to public awareness and education. [M-f5RA] (See Policy 88 regarding the recommendation that certain kelp beds be included in a coastal reserve system.)

Vitality of California's Coastal Fisheries. Living marine resources are not only important in supplying protein and other products, but they also contribute at least \$600 million annually to the California economy, including income from processing, retailing, sport fishing, and fishing gear suppliers. The continued vitality of California's coastal fisheries (commercial and recreational) will require effective State, national, and international management to restore and maintain harvestable species at "optimum sustainable yield" (the catch level that can be continued indefinitely while stock is maintained or restored). [M-f12,13]

Present Fisheries Management Is Inadequate. Present State management and regulations may sometimes be inadequate. Research and monitoring programs are often fragmented and incomplete. Some fishing regulations are seen as punitive, particularly in view of the fact that California's commercial fishermen, sport fishermen, as well as fishermen from other states and nations, must all compete for available resources, yet are not all subject to the same laws. Even within California's jurisdiction, the State Legislature regulates commercial fisheries, while the Department of Fish and Game is primarily concerned with sport fishing. Overfishing—in the absence of regulations or by unregulated foreign or illegal fishing operations—can seriously deplete fish stocks to the detriment of commercial and sport fisheries, the general public, and the marine environment. [M-f13]

Aquaculture in Coastal Waters. Aquaculture (marine agriculture) involves the cultivation and harvest of aquatic organisms. Currently it produces most of the mollusks marketed on the West Coast. In the future aquaculture techniques may be improved and applied to other species, reducing costs and increasing availability of fish and shellfish as sources of protein. Coastal lagoons

and estuaries are the predominant locations for aquaculture operations. Generally, aquaculture can coexist with any activity that does not cause pollution or deterioration of the marine environment. Some species can even thrive in heated waters in the vicinity of energy generating plants. Other species may be able to utilize nutrients from properly treated sewage discharges. However, some aquaculture operations may require the use of open waters now accessible to the public, thereby converting them to "private" waters. Additionally, aquaculture alters a natural habitat by selective cultivation of a plant or animal and so may displace other species. [M-f14]

POLICIES

1. Protect and Restore Marine Resources. It should be public policy at all levels of government to maintain, enhance, and, where necessary, restore marine resources. While the entire ecosystem must be protected, special protection shall be given to areas and species of special biologic or economic importance including those identified by the State Water Quality Control Board's Areas of Special Biological Significance, by the State Department of Fish and Game, and in the Coastal Plan. Uses of the marine environment—for commerce, food supply, mineral extraction, and recreation—shall be carried out in a manner that does not diminish the productivity of coastal waters or threaten the existence of native species. [M-p1]

2. Maintain Populations of All Marine Organisms. Healthy and adequate populations of all species of marine organisms for commercial, recreational, scientific, and educational purposes must be maintained. [M-p13] To this end:

a. Effective Marine Resource Management. A single State agency should be charged with the management of living marine resources, exercising jurisdiction over California nearshore species of marine organisms for both commercial and sport fisheries and for kelp harvesting. [M-p13b] This agency should coordinate its research and management programs with the comprehensive ocean water quality research and regulatory program described in Policy 5. This State agency should be responsible for maintaining and restoring scientific, educational, recreational, and aesthetic uses

of living marine resources; developing and implementing habitat restoration and kelp propagation programs; disseminating public information; monitoring and coordinating all existing marine research programs; and determining population structure and dynamics and monitoring fish capture rates in order to establish optimum sustainable yield standards for all harvestable species. [M-p13c] The desirability of limited entry (similar to the present regulation of kelp harvesting) as a long-term fisheries management tool should be investigated. [M-p13b] Programs for hatcheries and stocking and for a commercial fishing academy should also be investigated and, where appropriate, implemented. [M-p13c]

- b. Cooperation with Other States and Nations. California should continue to actively pursue working relationships for effective fisheries management with adjacent states, should actively participate in appropriate organizations, and should support international fisheries control that is adequate to protect worldwide marine resources. [M-p13a]

Regional Amplifications

North Coast: All efforts to increase a salmonoid population should be supported, and abalone should be managed as a sport fish resource in the North Coast Region. Commercial kelp harvesting should be prohibited in the North Coast region. [M-p13RA]

North Central: A North Central Coast Research Group should be formed as a technical advisory group to provide current accurate information to the Commission for translating its policies to enhance and protect the marine environment. [M-p13RA]

South Coast: The State agency should establish a living marine resources hatchery to help restore marine species of recreational and commercial importance and their habitat in southern California. Candidate species include shrimp, lobster, clams, abalone, croaker, and various species of seaweed. [M-p13RA] Restoration efforts of kelp beds around Palos Verdes Peninsula should be continued. [M-p10RA] International efforts to manage increasing fisheries pressures should give high priority to the Bishop Rock-Cortez Bank area. This Region should receive high priority for first phase installation of a statewide monitoring and habitat protection system because exploitive pressures are most intense. [M-p13RA]

3. Evaluate New Aquaculture Operations. New or expanded aquaculture operations in coastal waters shall be permitted only if they would preserve, restore, or enhance areas for public use and would not displace productive natural habitats. [M-p12]

4. Maintain Commercial Fishing Facilities. Adequate berthing and support facilities should be provided for working commercial fishing boats. No existing commercial fishing port space shall be eliminated unless adequate substitute space is assured. [M-p11] New or major expansions of recreational boating facilities that might use up remaining areas suitable for commercial fishing facility development shall be permitted only if it can be demonstrated that present facilities serving commercial fishing in the area are adequate or that construction of needed additional facilities is assured. [New]

Coastal Water Quality

FINDINGS

Water Quality Management Split Among Many Jurisdictions. Current water quality management programs are divided among Federal, State, regional, and local jurisdictions. The primary requirements are contained in the 1972 Federal Water Pollution Control Act and its Amendments. The State Water Resources Control Board and the Regional Water Quality Control Boards administer the discharge permit requirements mandated by State and Federal regulations and prepare required basinwide and specific area wastewater discharge plans and programs. They also administer Federal grants for upgrading of treatment facilities and designate Areas of Special Biological Significance. The State Board's Ocean Waters Plan sets waste discharge quality requirements to protect beneficial uses of ocean water, including maintenance of marine life; its Thermal Plan places restrictive requirements on existing and new thermal discharges; and the Bays and Estuaries Policy severely limits the discharge of municipal waste waters and industrial process waters to enclosed water bodies. A variety of local, subregional, and regional authorities are involved in collection and treatment of waste waters. Local health departments authorize septic tanks in areas without sewer systems. [M-f10]

Some Water Quality Program Changes Underway. A number of additional important water quality programs are currently being developed. The Federal Environmental Protection Agency (EPA) is applying effluent limitations for various types of domestic and industrial sources of waste water. Regulations for electric power generating plants (important for both thermal and other effluent components) were proposed in March, 1974. A number of Regional Water Quality Control Boards are currently developing erosion control policies under the requirement that general sources of pollution, such as construction practices, be controlled. [M-f10]

Coastal Commission Can Set Stricter Standards. The Federal Coastal Zone Management Act, which partially funds the Coastal Commission, requires that the Federal requirements and those of State and local governments pursuant to the Federal Act may not be weakened in any way by the coastal management program, although the Commission may impose stricter wastewater quality criteria. [M-f10]

POLICY

5. Develop Ocean Water Quality Research and Regulatory Program. A comprehensive ocean water quality research and regulatory program should be developed and implemented. The program should include empirical studies of the present condition of marine living resources (baseline studies), assessment of damage from various activities, and evaluation and appropriate control of all potentially hazardous discharges and development activities affecting the marine environment. [M-p13d] This program should be closely coordinated with the living marine resources management program described in Policy 2.

WASTE DISCHARGES

FINDINGS

Waste Discharges Impair Essential Water Quality. Currently 130 waste disposal outfalls dump 444 billion gallons (1.36 million acre-feet) of domestic and industrial sewage, which has received varying degrees of treatment, into California's bays, estuaries, lagoons, and inshore waters. Such discharges may seriously impair water quality which is essential to the health of marine as well as human life.

Enclosed Water Bodies Are Especially Susceptible to Damage. Enclosed bodies of water such as bays, estuaries, and lagoons, with their limited water circulation and abundant plant and animal species, are more susceptible to damage from water pollution than is the open ocean. Most wastes discharged into the water consume oxygen as they decompose or break down. Many wastes are natural products that the sea can decompose and reintroduce into the life cycle, but with large amounts of organic material or with discharges into enclosed or semi-enclosed areas with poor water circulation, wastes can cause fish kills, algal blooms, stagnation and foul odors, and smothering of benthic (bottom dwelling) organisms. [M-f9]

Mid-1977 Deadline for Secondary Treatment of All Sewage. Following primary treatment of raw sewage, wastes still contain 60 to 70 per cent of the original organic material when they are discharged. Federal law now requires that, by July 1977, all sewage receive secondary treatment, or its equivalent, which will remove 80 to 90 per cent of the oxygen-demanding organic wastes. There

is differing scientific opinion as to whether such extensive oxygen-demand removal is necessary for deep ocean discharges. Secondary treatment may also reduce the concentrations of micro-organisms, chemicals, heavy metals, particulates, and silt loads in discharged waste waters. [M-f9a]

Many Present Discharges Are Inadequately Treated. At present many of the sewage discharges into coastal waters are inadequately treated. Only 15 per cent of all municipal waste waters discharged off the coast of Los Angeles and Orange Counties in 1973 received secondary treatment, for example. This results in an intense concentration of pollutants in the area between Newport Bay and El Segundo. Santa Cruz's Eastcliff sewage plant and Pacific Grove's plant both discharge effluent with only primary treatment into Monterey Bay, although these plants are scheduled to tie into improved sanitation systems in the next few years. There are many other areas suffering adverse effects from the discharge of inadequately treated waste water. [M-f9RA]

POLICIES

6. Maintain, Manage, and Restore Marine Water Quality. Water quality essential to marine life and human health shall be maintained, managed, and restored as a scarce and valuable resource. [M-p6] To this end:

- a. Upgrade Existing Municipal and Industrial Discharges. All municipal and industrial waste discharges should be upgraded to meet the goals and standards of the 1972 amendments to the Federal Water Pollution Control Act. Implementation of this policy (requiring secondary treatment of wastes by 1977) should be reviewed if the weight of future scientific study discloses that such treatment is not needed for deepwater waste discharges. First priority in the coastal zone should be given to improving or eliminating discharges that adversely affect wetlands, estuaries, other biologically sensitive areas (see Policy 1), and ocean areas subject to massive waste discharge (e.g., between Newport Bay and El Segundo). Outfall sites and equipment should also be improved to provide maximum dispersal of discharged waste waters. [M-p6a]
- b. Phase Out Discharges to Enclosed Bays and Estuaries. Existing discharges of municipal waste waters and industrial process waters to enclosed bays and estuaries should be phased out as soon as possible and new discharges prohibited unless it can be shown that such waste water is con-

sistently treated so as to enhance the quality of receiving waters above that which would occur in the absence of the discharge. [M-p6b]

c. Require Adequate Treatment for New or Enlarged Discharges to Ocean Waters.

New or enlarged sewage systems and treatment plants discharging to ocean waters shall meet present Federal requirements and shall either neutrally affect or enhance the receiving waters, based upon specific studies of each proposed outfall location, considering ocean chemistry and mixing processes, marine life conditions, other present or proposed outfalls in the vicinity, and relevant aspects of areawide waste treatment management plans and programs. [M-p6c]

d. Control Discharges from Non-Sewered Developments. New or expanding developments that are not connected to sewer and sewage treatment systems shall meet strict waste discharge requirements to prevent any adverse impacts, including long-term and cumulative impacts, on marine waters. The State Water Resources Control Board, Regional Water Quality Control Boards, and county health departments should be adequately funded and directed to establish and enforce appropriate water quality criteria.

[M-p6e]

e. Restrict Expansion of Substandard Sewage Systems. Expansion of sewer service in systems with substandard treatment and disposal facilities shall be restricted. [M-p6e]

f. Require Source Control. Toxic and hard-to-treat substances, such as discharges from certain industries, shall be required to be pretreated at the source if such substances would be incompatible with effective and economical treatment in municipal treatment plants. [M-p6f]

Regional Amplifications

North Coast: Additional study should be conducted before a total prohibition is imposed against further sewage discharge in Humboldt and perhaps other bays in the North Coast Region. [M-p6RA]

North Central: The comprehensive plans being developed to improve water quality within the San Francisco Bay system should assure protection of ocean resources, and land reclamation of waste should be given careful consideration. [M-p6RA]

Central Coast: When the Water Board has indicated that it is considering the adoption of higher standards, projects should be approved only if they will be able to meet the higher standards or if the project itself is a scheduled step toward meeting the higher standard. [M-p6RA]

San Diego: Sewage effluent with secondary treatment level or higher should be allowed to enter coastal lagoons and estuaries in accordance with the comprehensive water management plan for them. [M-p6RA]

7. Stress Reclamation of Waste Water. Reclamation and reuse of adequately treated waste water (for agricultural, industrial, recreational, fish and wildlife, or domestic use) should be fully considered as a preferred alternative to discharges into coastal waters for, or as a desirable component of, all water and waste water management programs. Projects incorporating reclamation should be given funding priority over those that do not. [M-p6d] (See also Coastal Land section on Water Supply Management.)

8. Regulate Wastes from Vessels. All vessels and related facilities should be equipped to prevent sewage discharges to enclosed bodies of water (e.g., sewage system hookups for large ships at berthing docks and holding tanks and pump-out facilities for small craft). Discharges from vessels into open waters shall be regulated to prevent adverse impacts; Environmental Protection Agency standards and Coast Guard certification procedures (currently being developed) should be rigorously enforced. [M-p6g]

HEATED AND COOLED DISCHARGES

FINDINGS

Power Plants Use and Discharge High Volumes of Water. Over three trillion gallons (9.2 million acre-feet) of seawater are now used every year to cool power plants on the coast and are then discharged at warmer temperatures into marine waters. Based on industry data, the amount of coolant water circulated through the Southern California Edison plants within the South Coast region

alone would cover a 12 square mile area, one foot deep, daily. Additional uses of seawater, especially for major heating and cooling systems in energy facilities, are proposed. [M-f9c/RA]

Industrial Uses of Seawater Have Adverse Effects. Coastal waters used for heating or cooling purposes, industrial processes, or mineral extraction can adversely affect the marine environment. Water is discharged at temperatures higher than ambient conditions. For example, thermal discharges from power plants between El Segundo and Huntington Beach increase the surface ambient water temperature at any given time by 4°F or greater over a combined area of almost two square miles. New currents or turbidity are created near intake and outflow points. Marine life is subjected to entrainment in the system. And chemicals used in such systems can kill many plants and animals. [M-f9c/RA]

Many Potential Effects of Heated Discharges. Research to date has been inconclusive in determining the exact beneficial and detrimental impacts of heated water discharges, but potential effects can include the following: (1) Some species that cannot tolerate the warmer water will leave or die off. (Kelp is among heat-sensitive organisms, with adverse effects generally at temperatures exceeding 66°F.). (2) Other native species and aquaculture operations may be enhanced by warmer temperatures. (3) Reproduction and migration patterns of some species may be disrupted. (4) In restricted water bodies, the amount of oxygen dissolved in the water may decrease to a small extent, while the amount required for life processes will increase. [M-f9c]

Little Is Known About Effects of Cooled Water Discharges. In the process planned for use at proposed liquefied natural gas (LNG) facilities on the California coast, large amounts of seawater would be used to heat the super-cooled LNG, transforming it to a gas through heat exchangers in the vaporization facility. In the process, the seawater is cooled; it is returned to coastal waters at temperatures as much as 12°F. below ambient temperatures. Although it is known that reductions in water temperature can be fatal to marine life, little specific data has been developed on the effects of continuous cold water discharges on marine ecosystems. There is reason to suspect that unnatural reductions in temperature have a particularly severe effect on embryonic and fetal development. Because the problem has not yet presented itself in California, the State Water Resources Control Board has not developed standards for cold water discharge comparable to those for heated discharges. Under existing rules and procedures, the Regional Water Quality Control Boards would regulate such discharges on a case-by-case basis to prevent adverse effects on beneficial uses of the receiving waters. [E-fl21]

Entrainment Kills Marine Organisms. Many marine organisms, including phytoplankton, zooplankton, fish larvae, and small fish, are entrained as water is drawn from the sea for use in industrial or power plants. Many of these entrained organisms are killed due to pressure and temperature changes, impingement, physical abrasion, and chemicals.

Chemicals Cause Additional Adverse Effects. Periodic "hot cycle" or chemical treatments with biocides for flushing the cooling or heating systems can cause additional damage to marine organisms in the immediate vicinity of the outfall. [M-f9c]

POLICY

9. Avoid Adverse Effects of Thermal Discharge and Entrainment. The adverse environmental effects of the intake of seawater and of discharges of heated or cooled seawater shall be minimized or avoided: [from M-p7 and E-p43]

a. Criteria for Permitting Thermal Discharges. Warmed or cooled water

discharges shall be permitted only where rapid return of water to normal ambient temperature can be assured and where best available mitigation measures (such as diffusers, or the discharge of cooled water in offshore deep water, out of sensitive biological areas) have been incorporated as necessary to minimize effects on marine life.

Cooled water discharges shall be permitted only where there is no other feasible use of the cooled effluent in commercial or industrial operations, consistent with other Coastal Plan policies.

b. Prohibit Discharges into Sensitive Biological Areas. New warmed or cooled water discharges into coastal wetlands, marine reserves, wildlife refuges, education and research reserves, or in the vicinity of kelp beds shall be permitted only if it can be conclusively demonstrated that there will be no significant adverse environmental impacts.

c. Study Marine System at Future Sites of Seawater-Using Plants. Independent "baseline" studies of the existing marine system shall be conducted and evaluated for all potential seawater-using plant sites at the applicant's expense several years in advance of the anticipated start of construction of a major seawater-using power or industrial plant, including sites for LNG vaporization facilities proposing the direct use of seawater as a heat source.

d. Prefer Closed or Evaporative Cooling Systems. Until more is known about the effects and methods for mitigating impacts of once-through cooling

systems, closed or evaporative systems shall be required unless an applicant can demonstrate that overall environmental advantages justify the use of once-through cooling systems.

- e. LNG Plants Should Use Already Heated Water. Where feasible, LNG vaporization plants shall be required to use heated effluents from nearby power plant or other industrial operations, rather than seawater at ambient temperatures, for a heat source.
- f. Minimize Entrainment. Where cooling or industrial processing waters are drawn from marine waters, the best available technology shall be utilized and the location and site chosen shall minimize the intake and mortality of all forms of marine life (e.g., offshore intake points, velocity caps, and fish return systems).
- g. Research Effects of Thermal Discharges. A State agency should be adequately empowered and funded to direct and coordinate research on the environmental effects of thermal (heated or cooled) discharges, anti-foulant biocides, and entrainment of organisms.
- h. Monitor Discharges, Require Mitigation Measures. Existing and new thermal discharges should be periodically monitored (by independent researchers or a State agency). Appropriate mitigation measures or alternative heating or cooling systems shall be required where significant adverse impacts are discovered. [M-p7 and E-p43]

Regional Amplification

Central Coast: Coastal power plants in this region shall be prohibited from using once-through cooling in new or expanded facilities. The coastal agency shall permit construction of new cooling facilities to replace once-through facilities and new water treatment plants designed to reduce the discharge of pollutants into the marine environment. [E-p14RA]

OIL AND TOXIC SPILLS

FINDINGS

Several Sources of Oil in the Sea. Oil enters the sea from several sources, including deballasting of tankers, bilge pumping, ship accidents, vessel operations and ship yards, sewage effluents, oil well accidents, fallout from air pollution, and natural seepage. [M-f9]

Oil Spills Have Differing Reported Impacts on Marine Environment. There are conflicting opinions on the environmental effects of oil spills, but in general oil spills are more hazardous to the marine environment in nearshore areas than in deep water because productive shoreline, estuarine, and bay and harbor areas are affected immediately. The damaging effects tend to be more severe from refined products than from crude oil. Although some animal species (possibly including some rare or endangered species) are highly vulnerable to petroleum and could be wiped out by a major oil spill, many species seem to reassert themselves following the initial die-off after a spill. [from E-f87]

Long-Term Effects of Spills Not Completely Known. Oil seems to be absorbed by many bottom sediments and re-emitted for many months or years after a spill. Sub-lethal effects of oil pollution may endanger the long-term survival of a species or the entire ecosystem, but there have been few research projects on these effects and conclusions so far have been conflicting. [E-f87]

Further Studies of Effects, Complicated by Natural Seeps, Are Underway. Additional research on the sources and effects of oil in the ocean is being conducted by various groups in California. Studies on the effect of spills along the coast are complicated by the presence of natural oil and gas seeps that regularly emit petroleum, with unknown effects on the marine environment. The Division of Oil and Gas has documented over 50 seeps and seep areas between Point Conception and Huntington Beach, and many more seeps probably exist; although oil and gas seeps have occurred near the sea in Marin and Humboldt Counties, there are no known offshore seeps north of Point Conception. [E-f87]

Coastal Communities and Activities Are Impacted by Spills. Oil spills are aesthetically displeasing; they cover beaches, create odors, can impart an unpleasant flavor to fish, and may have significant economic and psychological impact on human communities within the coastal zone. Recreation, commercial fishing, and water-related activities suffer the most severe direct damage, but can recover in the absence of further spills. Of all the existing or proposed Federal offshore production areas—on the Gulf of Mexico, Atlantic, and Alaskan continental shelves—only California's producing area is located close to a large human population (10 million plus) that is directly affected by the environmental, aesthetic, psychological and economic effects of offshore production. [E-f88]

Amount of Damage Depends on Several Factors. The amount of damage from an oil spill varies in degree and duration depending on the quantity and type of oil, the degree to which it has been refined, wind and wave conditions, and the location of the spill, with the most serious damage normally taking place in nearshore waters and enclosed bays and estuaries. Some cleanup procedures taken to counteract the effects of an oil spill may be more destructive than the spill itself, such as the use of detergents or techniques that coagulate and sink oil to the ocean floor. [M-f9]

Existing Oil Liability Measures Are Inadequate. Although California has suffered several oil spills off its coast, primarily from tanker mishaps and deballasting of fouled water, and from an offshore oil platform blowout, existing liability programs are largely inadequate.

- a. State. The State of California itself has no funding to pay the costs of oil spill damages but instead relies on the State Attorney General to file suit against the appropriate contingency or compensation funds or against other parties for cleanup costs and damages incurred by the State. Other individuals damaged by oil spills must seek their own relief.
- b. Federal. The Federal Water Pollution Control Act makes a tanker owner or operator liable for cleanup costs up to \$14 million, and a terminal operator liable for up to \$48 million. Liability is unlimited if there is willful negligence or misconduct; but there is no liability if the discharge was caused solely by an act of God, act of war, negligence by the U.S. Government, or the act or omission of a third party. There is also a National Contingency Fund of \$35 million, provided by the U.S. Treasury, for use of the Coast Guard or EPA in cleaning up spills, or for reimbursement to states of their costs incurred in cleanup. These laws apply to cleanup liability, but do not provide for compensation of damages. The Deepwater Port Licensing Act, passed in late 1974 to govern deepwater port development in Federal waters, creates a deepwater port liability fund of \$100 million by a tax levy of two cents per barrel on oil that is loaded or unloaded at the terminal. The bill makes owners and operators of vessels liable, without regard to fault, for discharges and damages up to \$20 million, and makes deepwater port licensees liable, without regard to fault, for up to \$50 million. Costs and damages not actually paid by the vessel owner/operator or port licensee would be compensated by the liability fund. A draft Senate bill relating to Outer Continental Shelf (OCS) development proposes a similar scheme to cover spills caused by drilling and production activities offshore. The Council on Environmental Quality has proposed creation of a single national liability fund to cover spill cleanup costs and damages from all sources in State or Federal waters.
- c. International. Two international industry voluntary compensation funds, TOVALOP and CRISTAL, provide oil pollution liability coverage for participating companies of \$10 million and \$30 million, respectively, for cleanup and third-party damages. In addition, two international conventions that would establish civil liability, with limits, and an international compensation fund have been proposed and are being circulated for ratification; they would become effective only if ratified by the U.S. Senate and by a sufficient number of other nations.

Existing Liability Programs Are Inadequate. Except for the liability provisions of the Deepwater Port Licensing Bill, the existing liability programs are inadequate for a variety of reasons: some provide only for cleanup costs, and not for damages; all provide dollar amounts that may be inadequate in the event of a major spill; all leave a very heavy burden upon states and individuals to litigate for compensation of damages; all leave the question of liability to the law of ordinary negligence, rather than to strict liability. The proposed alternative programs would variously remedy these deficiencies. Enforceability of liability laws may be greatly facilitated by development of techniques for tracing spills to their sources. [E-f104]

Several Toxic Substances Harm Marine Life. Chlorinated hydrocarbons (such as DDT) and polychlorinated biphenyls (PCB) as well as heavy metals (such as mercury, lead, silver, cadmium, copper, chromium, and zinc) find their way into the marine environment from a variety of sources, including domestic and industrial effluents, rainwater runoff (containing pesticides and other substances from urban and agricultural areas), ship repair yards where anti-fouling paints are removed, and air pollution fallout. Some of these substances accumulate in sediments, complicating dredge removal and disposal. Most of these substances, in excess quantities, have been shown to have some adverse effects on marine organisms, and there is evidence that some, such as DDT and PCB, may also ultimately affect humans because they may build up in concentration as they move up the food chain. The most effective, economical, and equitable means to control such substances is to contain or treat them at the source. [M-f9]

POLICIES

10. Strictly Regulate Release of Oil and Other Toxic Substances. The release of fuel and oil, many chemicals, heavy metals, and other toxic substances into the marine environment shall be strictly regulated and adverse effects avoided. [from M-p8] Specifically:

- a. Prevent Petroleum Spills from Affecting Sensitive Areas. Petroleum facilities (e.g., tanker terminals, refineries, and drilling operations) shall be permitted only where it can be demonstrated that: (1) under Coastal Plan energy policies the facility is necessary and there is no alternative location that would result in less environmental damage; (2) accidental spills will not adversely affect sensitive biological or aesthetic areas, as identified by State and Regional Water Boards, Department of Fish and Game, Department of Parks and Recreation, the Coastal Plan, or other appropriate public agencies; and (3) the best available technology and mitigation measures have been incorporated to prevent oil leaks and spills. [M-p8c]
- b. Regulate Other Vessel-Related Pollution. State regulations should be established and enforced: (1) requiring vessel-fueling and deballasting equipment and practices that would eliminate spills and leaks to the maximum extent possible; and (2) prohibiting the manufacture and sale of sloughing types of boat anti-fouling paints. [M-p8b]

- c. Research and Regulation Enforcement. A State agency should be adequately empowered and funded (1) to direct and coordinate research on the effects of oil, heavy metals, and other contaminants on the marine environment, on new techniques for spill prevention, containment, and cleanup, and on methods of tagging or "fingerprinting" oil to determine spill sources; (2) to work with Federal agencies in providing coordinated supervision of all cleanup operations; and (3) to develop and enforce regulations prohibiting the use, sale, and manufacture of highly toxic substances and minimizing routine or accidental releases of other harmful substances.

[M-p8e]

- d. Make Polluters Liable for Damage. Polluters should be liable to fines and for all damages from oil (see following two policies) or other toxic spills resulting from their operations, whether negligent or not. Bonds (or other adequate assurance of financial responsibility) should be posted for potentially hazardous operations. [M-p8d]

11. State Should Enact Oil Spill Liability Measures. In the absence of Federal legislation adequate to guarantee immediate availability of funds for cleanup operations and prompt compensation of damages resulting from oil discharges; to ensure maximum effectiveness of oil spill contingency plans; and to encourage exercise of maximum care and use of highest state-of-the-art technology in offshore petroleum exploration and production operations and in tanker and tanker terminal operations, the Legislature is urged to enact the following measures: [from E-p26 and E-p33]

- a. Establish California Oil Spill Liability Fund. An Oil Spill Liability Fund, to be administered by the Secretary of the California Resources Agency, should be established to provide for all cleanup costs and to compensate all damages caused by oil discharges in any California or

Federal navigable water or reaching the shoreline thereof, resulting from any drilling, production, processing, or transport associated with development of the offshore resource or with operation of any tanker or tanker terminal, without regard to the cause of the discharge, except that the Fund should not be liable for any discharge caused solely by an act of war. The Fund shall recover any monies expended for clean-up operations or for damage compensation from offshore owners and operators, tanker and tanker terminal owners and operators, or other parties, as described below in subsection (d) of this policy. A part of the Fund should go annually toward further development of oil spill containment and cleanup technology, research and surveillance programs for identifying the sources of oil spills, and operating expenses of State and Federal Oil Spill Disaster Contingency Plans. The Liability Fund should be created and maintained by levy of a two-cent fee on each barrel of petroleum produced from a well on State lands, on each barrel of petroleum produced from a well on Federal lands that enters California for treatment, processing, or delivery, and on each barrel of foreign-produced petroleum loaded or unloaded at California tanker terminals. The Liability Fund should have a standing limit of \$100 million. Fees should be levied only at times when the Fund contains less than that amount, or when claims against the Fund exceed \$100 million.

- b. Liability for Spill Costs. Except when an offshore lessee or operator, or the owner or operator of any tanker, tanker terminal, or equipment or facility used in the production, processing, or transportation of oil can prove that an oil discharge from its operations was caused solely by an act of God, an act of war, negligence by the U.S. Government, or the act or omission of a third party, the lessee, owner or operator shall be liable to the Liability Fund for cleanup costs and damages resulting from such discharge and paid by the Fund. Such liability shall not exceed

\$20 million for individual owners and operators of offshore equipment, tankers, or other equipment or facilities used in the production, processing or transportation of oil, and \$100 million for individual terminal owners and operators, unless it can be shown that such discharge resulted from the gross negligence or willful misconduct of the owner or operator, in which case liability shall be for the full amount of all cleanup costs and damages.

- c. Drillers Should Post Bonds. Prior to leasing, each applicant for permission to drill on State tide and submerged lands should be required to show the State Lands Commission evidence of secured financial responsibility in the amount of \$20 million for each individual lease.
- d. Register Drillers and Tanker Owners and Operators. All drilling applicants and all owners and operators of tankers operating in California waters shall register with the California Secretary of State for service of process. [from E-p26 and E-p33]

12. Create Single National Oil Spill Liability Fund. The California Legislature and the California Congressional delegation should support Federal legislation creating a single national oil spill liability fund, covering oil discharges from all sources related to production, processing, or transportation of oil, incorporating the measures proposed above in Policy 11. In the event such Federal legislation is enacted, any unilateral California legislation on this subject should be repealed. [E-p26]

RUNOFF

FINDINGS

Runoff Can Degrade Coastal Water Quality. Abnormal silt loads (in runoff waters from construction, grading, removal of vegetation, and other upland developments and activities) can damage marine resources, especially in estuarine areas, due to sedimentation and increased turbidity. In addition

to silt and toxic substances, surface runoff can carry excessive organic matter (e.g., from failing septic tanks, logging debris, and agricultural operations) that further degrades marine waters. [M-f9] Siltation can also necessitate costly and environmentally damaging silt removal projects.

POLICY

13. Control Runoff that Degrades Coastal Waters. Runoff shall not be permitted to degrade coastal waters, especially wetlands, estuaries, nearshore reefs, tide pools, kelp beds, and other sensitive areas. [M-p9] To this end:

- a. Restrict Developments Causing Runoff. Developments that could directly or cumulatively have an adverse effect on coastal waters (because of such factors as induced erosion, harmful runoff materials, failing septic tanks, and animal wastes) shall not be permitted unless adequate measures are taken to prevent damage. [M-p9a]
- b. Treat Contaminated Runoff at Source. Runoff that contains substantial amounts of contaminants (including certain urban, industrial, agricultural, and boat and shipyard runoff) shall be treated or contained at the source. [M-p8a and from R-p9g]
- c. Adopt Ordinances to Control Runoff, Erosion, and Silt. A runoff, erosion, and silt-control model ordinance shall be developed by the coastal agency and the State Water Resources Control Board, and should be adopted and enforced throughout coastal watersheds by all appropriate regulatory agencies. [M-p9b]

Regional Amplifications

North Coast: No developments should be permitted adjacent to the Eel Canyon and Gorda Escarpment areas unless such developments provide over-riding benefits to the public. [M-p9RA]

South Coast: High priority for adoption of a runoff and silt control ordinance shall be in the San Diego Creek and Malibu coastal watersheds. [M-p9RA]

San Diego: Storm water runoff shall be periodically monitored for the presence of pollutants; where heavy pollutant loads are found, efforts shall be made to trace and control such pollutants at their source.
[M-p8RA]

Coastal Waters, Estuaries, and Wetlands

FINDINGS

Coastal Waters Are Highly Productive. Nearshore coastal waters (and especially estuaries and wetlands) are the most productive part of the sea. Coastal estuaries are lagoons, estuarine systems, and enclosed bays (all areas that are connected permanently, periodically or occasionally to the sea and within which seawater is diluted with freshwater runoff from the land). [M-f6] Coastal wetlands, made up of tidal marshes and mudflats, are a vital part of the productive coastal water system. Coastal waters are generally rich in nutrients carried from the land by the rivers and streams that also bring fresh water to these areas. And the generally shallow depths of estuaries and wetlands often allow sunlight to penetrate to the bottom, permitting plant growth to take place. The open water areas are also an important component of the total coastal marine environment, although they may not be as productive or fragile as shallow estuaries and wetlands. [M-f6]

Estuaries and Wetlands Are a Vital Link Between the Land and the Sea. Salt marshes are one of the most productive living systems known, ranking in productivity with intensively-cultivated rich tropical agriculture. Salt marsh plants transfer phosphorus compounds from the mud into the water, increasing the amount of this nutrient available to the microscopic plants (phytoplankton) that are a basic element in the marine food chain. Tidal mudflats support the growth of blue-green algae that fix atmospheric nitrogen so that it can be assimilated by other plants. [M-f6] The estuarine system is much more extensive than the areas subject to tidal influence. The area between the upper edge of the tidal zone and the surrounding upland vegetation communities can be critical in maintaining the environmental balance in estuaries. In addition the amount, timing, and quality of fresh water entering an estuary is essential to the existence of plant and wildlife habitats. [L-f2]

Many Fish, Bird, and Animal Habitats Are Found in Sheltered Coastal Waters. Many fish, water-fowl, shorebirds, wading birds, and other animal species use the productive coastal estuaries and wetlands either directly for habitat—spawning, nesting, resting, or feeding—or indirectly as a provider of essential food. Many rare or endangered species are entirely dependent on habitats found in California coastal waters. [M-f6] Because of the abundant wildlife present, estuaries and wetlands are valuable educational, research, and scenic resources. [new]

Estuaries and Wetlands Are Very Vulnerable to Abuse. Coastal estuaries and wetlands are particularly vulnerable to being used by man in ways that provide economic benefits but nevertheless destroy their natural values. Coastal estuaries and wetlands have been dredged for ports and marinas, subjected to sedimentation from upland erosion, filled to provide new land for development,

used as sumps for domestic sewage and industrial waste, and deprived of fresh-water inflow by water diversions. Of the original 197,000 acres of marshes, mudflats, bays, lagoons, sloughs, and estuaries in California (excluding San Francisco Bay), the natural productivity and open space values of 102,000 acres (52 per cent) have been destroyed by dredging or filling. Of California's remaining estuaries and wetlands, 62 per cent have been subjected to severe damage and 19 per cent have received moderate damage. [M-f7] In Southern California, 75 per cent of the coastal estuaries and wetlands have been destroyed or severely altered by man since 1900. Two-thirds of 28 sizeable estuaries existing in southern California at the turn of the century have been dredged or filled. [M-f7RA]

Dredging and Mining Can Have Adverse Environmental Effects. Dredging and mining can affect marine resources in several ways. Dredging tidal mudflats and salt marshes can completely destroy these most productive parts of the estuarine system. Newly dredged channels can change water circulation patterns in estuaries and can introduce new conditions that certain species cannot tolerate. Dredging and mining operations stir bottom mud, which can cause turbidity that limits photosynthesis in a small area and can recirculate oxygen-demanding or toxic materials that may have been trapped in the mud. These effects can be limited if careful dredging methods are used. Finally, disposal of the dredged materials ("spoils") can smother benthic (bottom-dwelling) organisms. [M-f11]

Some Beneficial Effects Are Possible. Dredging and spoils disposal can also be environmentally beneficial. Valuable marine environments may be able to be restored by dredging diked former wetlands to return them to tidal action, or by deepening lagoons that are drying up. The substrate for benthic plants and animals may be improved by dredging. Sandy dredge spoils placed on or near beaches or in littoral currents can aid in the replenishment of beach sand along the coast. [M-f11]

POLICIES

14. Protect Estuaries and Wetlands. All remaining coastal estuaries and wetlands and buffer areas necessary to protect wetlands and their wildlife and bird habitat values shall be preserved, enhanced, and where possible, restored. [L-p2 and M-p2]

To this end:

- a. Study Restoration Potential Before Any Alteration. Before any man-made alteration of a wetland or estuarine area is permitted, an overall plan, to be approved by the coastal agency, shall be prepared, at the expense of the proponent of the alteration. The plan shall assess natural resource protection and restoration, research and educational opportunities, recreational and aesthetic values, and shall evaluate the impact of any proposed facilities that can be provided in accordance with other Coastal Plan policies. [from M-p2RA]

- b. Restore Degraded Wetlands. All degraded marsh areas and diked unfilled former wetlands capable of restoration shall be restored for natural resource values and biological productivity, and new marsh areas shall be created except where they would significantly reduce open water areas or adversely affect water circulation. New development in degraded marshes or diked unfilled former wetlands shall be permitted only if: (1) the development is required for port or airport expansion or for energy facilities (consistent with Coastal Plan transportation and energy policies) after it has been conclusively demonstrated that there is a statewide need for the project and that there is no alternative location that would result in less environmental damage; or (2) the coastal agency determines, based on appropriate scientific study, that the marsh or wetland is not capable of restoration. [M-p3]
- c. Control Upland Development Affecting Estuaries and Wetlands. Development in upland areas adjacent to estuaries and wetlands shall be controlled to prevent adverse impacts on estuarine or wetland habitat values or significant degradation of the quantity and quality of water entering estuaries and wetlands by siltation, pollutants (including toxic, thermal, and organic pollutants), or waste water discharges. [L-p2]

Regional Amplifications:

North Coast: Due to the high productivity and sensitivity of coastal lagoons, no further commercial, industrial or residential developments shall be permitted in the upland area unless it can be shown that they will not significantly degrade the water quality of the lagoon or the creeks draining into the lagoons, including Stone, Big, Dry, and Freshwater Lagoons. Present uses of agriculture and forestry are compatible uses within the watershed and should be retained as long as they concur with Water Quality Control standards. The development of major water-related facilities should be avoided to retain wildlife and fishery values. [L-p2RA]

Central Coast: The following areas have been the subject of special evaluation and are considered to be of significant environmental importance so as to preclude any development that is adverse to their environment: Elkhorn Slough system, James V. Fitzgerald Marine Reserve, Pescadero Creek

and Marsh, Ano Nuevo Marine Reserve and Creek, Terrace Point Research Site and Moore Creek Lagoon, Hopkins Marine Life Refuge, Pacific Grove Marine Gardens Fish Refuge, Carmel Bay (proposed underwater park), Point Lobos State Reserve, and California Sea Otter Game Refuge. [M-p3RA] Any activity in the vicinity of Elkhorn Slough system which would adversely affect the quality of this resource shall be prohibited. [M-p2RA]

South Central: Special protection (i.e. restriction on man-made alterations, with the possible exception of restoration measures) shall be given to: Morro Bay, Goleta Slough, Mugu Lagoon, McGrath Lake, Devereaux Lagoon, the Dune Lakes, Oso Flaco, Santa Ynez River, El Estero, and Santa Clara River. [M-p2RA]

South Coast: High priority shall be given to restoration of Upper Newport Bay and Bolsa Chica as both have been identified as having statewide importance and significant restoration potential. Phase I of the state program to restore Bolsa Chica shall be implemented. Further development shall be required to maintain or further restore natural habitat and related public scientific and educational values. The program to protect and restore Upper Newport Bay shall include: (1) acquisition of sufficient uplands to make Upper Newport Bay a viable wildlife refuge and educational and recreation facility; (2) remedial dredging of accumulated silt and removal of salt dikes to restore tidal exchange; (3) prompt development of a surface runoff and silt control plan for the San Diego Creek Watershed to minimize man-made siltation and curtail pollutants which have resulted in public health hazards in Upper Newport Bay. Public regulatory agencies shall not issue any new discharge permits or sewer hookup permits in the watershed area that would contribute to bay pollution.

High priority shall also be given to (1) an interagency feasibility study to protect and restore Ballona Creek tidal system; and (2) an interagency plan to regulate land uses in and around Malibu Lagoon and to protect and adequately buffer the lagoon's wildlife, educational and passive recreational values. In the interim, no further development that encroaches on or precludes planning options in the Malibu Lagoon area shall be permitted. [M-p2RA]

San Diego: A comprehensive and enforceable regional plan should be prepared by the coastal agency, with the cooperation of the appropriate governmental bodies and agencies, to preserve and manage San Diego's coastal wetlands. The plan must be based on the study of each wetland, its surrounding and tributary areas and possible alternative sources of fresh water, encompassing an area defined by surrounding, physical characteristics, rather than by existing political subdivisions. Before any coastal wetland area is committed to development it should first be determined whether the land or water area in question is or is not, in fact, burdened with a public trust. Santa Margarita Marsh, Agua Hedionda Lagoon, Batiquitos Lagoon, San Elijo Lagoon, San Dieguito Lagoon, Los Penasquitos Lagoon, and Tia Juana Estuary should be retained as tidal or restored to tidal action on a managed basis. No development foreclosing on opportunities for such restoration shall be allowed. Because of their current state and their wildlife and other resource importance as coastal fresh bodies of water, the San Mateo Marsh, Los Flores Marsh, and Buena Vista Lagoon shall be retained as non-tidal. Diking designed to create fresh

water habitats in coastal lagoons shall be permitted provided it is part of the adopted management plan. Artificial methods for allowing sediment carried downstream by rivers to bypass lagoons should be developed. [M-p2RA]

15. Restrict Landfill, Diking, and Dredging of Coastal Waters. Landfill, diking, and dredging in coastal waters shall be permitted only if (1) a necessary part of a wetland or estuarine restoration plan pursuant to Policy 14, (e.g., dredging to restore water circulation or reduce sedimentation, diking to create freshwater habitats or sand bypasses); (2) required for port or airport expansion or for energy facilities (consistent with Coastal Plan transportation and energy policies) after it has been conclusively demonstrated that there is a statewide need for the project and that there is no alternative location that would result in less environmental damage; [from M-p2a] or (3), in the case of dredging, for maintaining existing or restoring previously dredged depths in existing navigational channels, turning basins, and vessel berthing areas. Dredging or diking to restore natural environments should be considered experimental and the results carefully monitored. [M-p4a]

16. Require Replacement Areas for Diked or Filled Areas. Where landfill or diking is permitted, equivalent compensation areas shall be created, or sufficient in-lieu fees shall be dedicated to an appropriate public agency, to replace the diked or filled areas with an area of equal or greater size and biological productivity (for example, by restoring degraded wetland areas). [M-p2b] (See also Policy 180 regarding provision of replacement areas).

17. Regulate Permitted Dredging. Where dredging is permitted, the least environmentally harmful dredging method shall be used. Dredging operations shall be planned and scheduled to avoid unnecessary disruption to fish and bird migrations, marine habitats, and water circulation. [M-p4b] Bottom materials shall be analyzed for content prior to dredging or mining, and dredge spoils disposal regulated as follows. [M-p4c] (Ongoing studies of dredging

and dredge spoils disposal alternatives, such as those by the Army Corps of Engineers, should be evaluated as a basis for further refinement of these policies).

- a. Require On-Land Disposal for Toxic Spoils. Where bottom materials contain toxic substances that could harm marine life when disturbed or disposed, dredging or mining should be avoided if at all possible. Where dredging of toxic materials is found to be necessary, harmful substances in dredge spoils shall be isolated and treated or disposed of on land in a manner that prevents pollution of marine, underground or surface water. [M-p4c]
- b. Disposal of Other Spoils. Dredge spoils suitable for beach replenishment shall be transported for this purpose to appropriate beaches or into suitable longshore current systems. [M-p4d] All other dredge spoils shall be disposed of in one of the following ways, based on assessment of the specifics in each situation: on dry land; in specifically authorized fill sites; or in deep ocean areas subject to Region IX Environmental Protection Agency interim guidelines and at sites chosen to minimize all potential adverse impacts to marine organisms. Ocean dumping of other materials should be subject to Region IX EPA authorization. [M-p4e]

Sand Movement and Shoreline Structures

FINDINGS

Ocean Beaches Depend on Sand. Ocean beaches are one of the most highly valued recreational features of the California coastal environment. But many of these beaches are being lost to erosion. The stability of a sand beach depends on maintaining the dynamic equilibrium of a "sand budget"—a balance between sand brought to a section of beach and that removed from it, either by nature or by man's actions. [G-f18] (See the Land Environment section on coastal streams regarding the supply of sand from inland sources).

Sand Is Moved Along the Shore. Beach sand is transported by wind, waves, and wave currents in three kinds of movement—offshore, onshore, and longshore. The sand, when put into suspension by wave action, may move laterally along the shore in longshore currents; at the same time it is being transported offshore and returned onshore. The sand movement along the shore occurs within relatively distinct sections of the coast, sometimes called "littoral cells". These extend from the point where the sand supply is introduced to the shoreline, mostly by streams, downdrift to the place where it is swept out to sea, often irretrievably into offshore canyons. There sometimes are small indentations in the coast partly isolated from the sand movement system of the littoral cells by rocky headlands; within these areas, cliff erosion and onshore currents supply the sand to small pocket beaches. In addition to wave action, wind can move both beach sand and sand dunes. Sand is also lost by abrasion, coastal subsidence, and mining. [G-f19]

Human Activity Increases Beach Sand Losses. Man's activity has not only reduced the supply of sand; it has also increased the rate of loss, or changed the distribution, through improper design and placement of groins, jetties, breakwaters, and dredged channel entrances in shoreline waters. Another problem can be loss of sand dunes to wind action due to their disruption by vehicles, removal of vegetation, or excessive foot traffic. [G-f21]

Measures to Restore Beaches Involve Environmental Problems. Several measures attempt to maintain sand supplies on beaches, but most of these efforts involve serious environmental problems and require repeated work. Maintenance of beach sands is attempted by either increasing the supply of sand to a depleting beach or by decreasing the movement of sand off the beach. Several methods for increasing sand supply are: (1) mining offshore sand sources; (2) placing harbor dredge material on nearby beaches or into longshore currents; and (3) transporting material from inland sand sources to depleted beaches, including material accumulated behind inland dams. Methods for decreasing sand loss from beaches may include: (1) structures to reduce the longshore movement of sand, such as groins and detached breakwaters; (2) devices to reduce wave action, such as submerged reefs or detached breakwaters; and (3) sand bypassing systems to mechanically pass the sand by a harbor entrance that has altered the natural longshore movement of sand.

Beach Sand Losses Are a Costly Problem. The necessary combination of measures to maintain beach sands can be extremely expensive, costing over \$1 million for a single beach restoration project at Doheny State Beach, Orange County, for example, and often involving high annual costs for on-going sand replenishment. [G-f23] Damage due to beach erosion in California was approximately \$10 million in 1965. The Water Resources Council projects the annual loss to be \$15.7 million in 1980 and \$29.7 million by 2000, unless large-scale preventive measures are taken. [G-f22]

Shoreline Erosion Is Being Studied. The U.S. Army Corps of Engineers and the California Department of Navigation and Ocean Development operate a cooperative program to study shoreline erosion. The current study program is almost complete in southern California and is continuing in northern areas. These research programs only indicate broad erosion problems, however, and accurate understanding of erosion processes requires analysis of specific sites before protective structures are designed or constructed. Additionally, the Corps of Engineers' Coastal Research Center provides for public distribution of pertinent reports on coastal engineering and coastal processes. [G-f17]

Shoreline Structures Also Affect Marine Life, Access, and Views. In addition to their effect on shoreline sand movement, marine structures (such as dikes, piers, and jetties) can impair productive habitat areas by interfering with water circulation, although properly designed structures may provide positive benefits as havens for small fish and as nesting and roosting sites. [M-f7] Marine and shoreline structures can also impair access to and along the shore and degrade the visual qualities of the coast. [new]

POLICY

18. Restrict Near-Shore and Shoreline Structures. New developments that modify shoreline processes, such as revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction, shall be restricted.

Where permitted, they shall be designed to minimize adverse impacts. [G-p8]

Specifically:

- a. Criteria for Permitting Structures. Such works shall be permitted only if it can be demonstrated that they are required (1) to maintain public recreation areas or to serve necessary public service facilities where there is no less environmentally harmful alternative, or (2) to protect principal structures of existing developments that are in danger from present erosion where the coastal agency determines that the public interest would be better served by protecting the existing structures than in protecting natural shoreline processes. [G-p8a]
- b. Mitigate Impairment in Sand Supply or Transport. Where permitted, such shoreline works shall incorporate mitigation measures to minimize and compensate for any impairment of local sand supply or adverse effects on the longshore transport of sand. Incremental construction shall be required, where possible, to allow ongoing evaluation and appropriate modifications. The project proponent shall be responsible for continued sand transport, where such transport is required. [G-p8b]

- c. Design of Structures. Shoreline works shall be designed to be minimal, unobtrusive, and compatible with maximum possible shoreline access and use, and shall comply with Coastal Plan appearance and design policies. [G-p8c, d]
- d. Marine Structures and Marine Life. Repair, replacement, or construction of marine structures shall be planned and designed to protect and enhance marine life conditions. [M-p5b] Existing marine structures that are found by the coastal agency or other State or regional agencies to cause water stagnation contributing to pollution problems and fish kills shall be phased out or upgraded. [M-p5a]

Coastal Land Environment

FINDINGS

Coastal Land Environment Is a Dynamic System. The coastal land environment is a combination of the soils, air, plants, animals, minerals and water courses as they are affected by or themselves affect the ocean--from the pounding surf line to the quiet inland valleys where the coastal fog influences plant species and growth. The land environment is a dynamic, interrelated system composed of streams that collect from entire watersheds to drain into coastal waters; natural areas, including the vital shoreline habitats that are the link between life in the sea and life on land and that harbor many rare species; coastal agriculture and forestry that are enhanced by rich soils and the maritime climate; coastal mineral resources, primarily sand and gravel; and the coastal airshed that is directly influenced by the ocean. [from L-f1]

Coastal Streams and Watershed Management

FINDINGS

Coastal Streams Are Vital to the Natural System of the Coast. Coastal streams directly affect the coastal environment: they are vital to anadromous fish that live in both salt and fresh water; they collect and transport sand from the watershed to supply coastal beaches; they are valuable to the aesthetic and recreational enjoyment of coastal waterways; and they are interrelated with the estuarine systems that in turn are essential to the productivity of the marine environment. Coastal streams also significantly influence flooding, natural ecosystems, agricultural water supply, and groundwater recharge within the coastal land environment. Watershed areas are thus an ideal focus for developing management techniques to maximize utilization and preservation of the natural resources of the coastal zone. [from L-f6] (See also following section, Water Supply Management.)

Streams Are Essential Habitat for Anadromous Fish. Salmon and steelhead trout spend part of their lives in the sea and part in freshwater streams. These fish are an important State recreational resource, and in the case of salmon, a commercial resource as well, but their abundance has declined by at least 50 per cent over the past 30 years, primarily due to human activities. The upstream spawning and nursery areas have been the most severely damaged habitat areas. [L-f7]

Human Activities Damage Stream Habitat. The upstream habitat has been damaged by many activities: dams that provide no adequate fish bypass facilities and that flood large spawning and rearing areas; water diversions and stream channelization; sand and gravel mining from streambeds; grading or logging operations that induce habitat-smothering erosion and siltation along streambanks, even from remote sites in the watersheds; land fills for various purposes; increases in water temperature caused by removal of shade vegetation; and discharges of toxic, thermal, or organic pollutants into habitat streams.

Present Regulations Are Inadequate. The State Department of Fish and Game, Regional Water Quality Control Boards, and Division of Forestry all have some regulatory powers dealing with stream habitat, but there is no agency with authority over new projects affecting habitat areas, and funding of existing programs is inadequate to enforce present habitat protection measures. The Department of Fish and Game notes that existing authority and funding is inadequate to provide full protection to spawning areas. [L-f8]

Beach Sand Is Generated and Transported by Coastal Stream Flooding. Though beach sand may come from cliff erosion, landslides, dunes, or onshore transport, most of California's beach sands are delivered by coastal streams. The principal mechanism by which the sands are collected and transported is flooding. The amount of sediment contributed by each stream depends on such factors as the area of the watershed, erodability of the watershed formation, runoff, land use, and stream slope. A number of studies have been done in the transport of beach sands from major rivers. For instance, in the past two years the U.S. Geological Survey has completed studies on the Eel, Mad, and Russian Rivers and Redwood Creek. [L-f9]

Human Activities Reduce Stream Flooding and Thus Affect Beach Sand Supply. Dams, settling basins, all flood control works, watershed erosion control, certain farming practices, urbanization, control of natural runoff on range and forest land, etc., reduce the natural flood flows of coastal streams and so eliminate or impair the continued generation and delivery of beach sands. Where the normal process of sand supply has been seriously impaired, severe depletion of beach sands and accelerated beach erosion has resulted, necessitating costly and continuous sand importation measures. [L-f10] (Conversely, in some cases downstream channelization in the alluvial plain may assist sand transport through the plain to the beaches.) [G-f20]

POLICIES

19. Establish Comprehensive Watershed Management. The planning and management of all new water projects, agricultural, forestry and mining practices, and other development within the watershed (except in already substantially urbanized areas) should be done on a comprehensive watershed basis, and an appropriate agency with regional jurisdiction should be designated to manage the coastal stream system. [L-p5] The coastal agency shall participate with other agencies in the development of appropriate multiple-use concepts for watershed plans. [L-p16]

In addition:

- a. Weigh Costs and Benefits of Watershed Projects. The watershed management agency, and the coastal agency for those projects within its jurisdiction, shall consider the environmental costs and benefits, as well as the economic costs and benefits, of each project within the watershed. [L-p5] (See

the policies of this section, and the section on Water Supply Management, for specific criteria.)

- b. Maximize Participation in Watershed Decisions. A procedure shall be developed by which notice of such projects shall be given sufficient that all interested persons and agencies will have adequate opportunity to participate in their review, normally at the stage when an environmental impact statement is being prepared and reviewed. [L-p5]

Regional Amplification

South Coast: Management and protection of the marine environment shall be closely coordinated with management of the shore and uplands. [M-p5RA] Such natural sand supply linkages as continue to exist between watersheds and beaches, through erosional action and runoff, must be maintained. The following watersheds must be protected from intensive development--from growth-inducing roads, sewers, and storm drains--and from any land use that would disturb replenishment and contribute to beach erosion: (1) in the Malibu area: Arroyo Sequit Canyon, Trancas Canyon, Zuma Canyon, Ramirez Canyon, Escondido Canyon, Solstice Canyon, Corral Canyon, Malibu Canyon, Carbon Canyon, Los Flores Canyon, Tuna Canyon, and Topanga Canyon; (2) in Orange County: San Joaquin Hills Canyon, Upper Laguna Canyon, Aliso Creek, Sulfur Canyon, Salt Creek, San Juan Canyon and Boat Canyon; and (3) on Catalina Island: Avalon Canyon and White Cove Canyon. (The list is not inclusive; research in the relation of beach sand supply from existing natural watersheds to regional beaches and other factors may warrant additions to the list.) [L-p8RA]

20. Review Projects Affecting Coastal Streams. The coastal agency shall be authorized to review, modify, approve or disapprove any activity (such as stream-bed mining operations, removal of shade or habitat vegetation, discharge of toxic, thermal, or organic pollutants, or grading or logging operations) or structure (such as permanent dams, flood control and water diversion projects, or stream channelizations) that would significantly interfere with natural sand supply processes or with anadromous fish spawning reaches or that would significantly affect the natural habitat, aesthetic, or recreational values of coastal streams. [from L-p5, L-p6a, L-p8, and R-p8f] (Note: The coastal agency's area of jurisdiction is to be specified as part of the final Coastal Plan. Review authority over specified critical developments outside of the coastal agency's area of jurisdiction is one possibility.)

21. Criteria for Projects Affecting Coastal Streams. In addition to other factors affecting the entire watershed, the coastal agency shall consider the following criteria in reviewing projects affecting coastal streams:

- a. Restrict Projects that Alter Natural Streams. Channelization of rivers and streams shall not be permitted unless necessary for flood control and consistent with other Coastal Plan policies. [A-p25b] Natural sand supply linkages between beaches and upstream watersheds, the upstream spawning and nursery areas needed by salmon and steelhead trout, and opportunities for canoeing, rafting, and kayaking on coastal anadromous fishery streams shall be protected and maintained or adequate mitigation measures provided.
[from L-p6, L-p8, and R-p8f]
- b. Approved Projects Must Offset Damage. Where stream-blocking structures are permitted, they shall be required to incorporate the best available mitigation measures, including (1) provision of anadromous fish runs or fish ladders, (2) maintenance of sand transport capability within the streams or alternative supply or other replacement for the loss of needed beach sand, and (3) replacement of any fish, wildlife, or valuable plant habitat substantially adversely affected by the project (such as by increasing hatcheries' capacity or restoring degraded areas). Costs of such mitigation measures shall be included in the operating budgets of the projects.
[from L-p5, L-p6a, and L-p8]
- c. Delay Projects Where Sand Supply Impact May be Irreversible. Where information is lacking or incomplete to document sand supply from inland sources or the effect of coastal mining, an appropriately designed study project shall normally be initiated prior to approval of any such activity that would interfere with natural sand supply and transport processes. However, if it can be established that such delay would result in unwarranted hardship, and that the public interest could be adequately protected through the posting of a bond or other appropriate legal guarantees, to be forfeited

if the project is subsequently established to be detrimental to coastal resources, a project may be allowed to commence prior to the completion of such a study. [L-p8]

22. Provide Special Protection for Anadromous Fish Streams. In addition to the regulation of stream-blocking structures, the upstream spawning and nursery areas needed by salmon and steelhead trout shall be protected and restored.

[L-p6] The coastal agency shall work with appropriate Federal, State, local, and private entities to develop implementation methods for appropriate protective and restorative measures. [L-p6c] To this end:

- a. Extend Authority of Existing Agencies. The authority and funding of the Department of Fish and Game, the Regional Water Quality Control Boards, and the Division of Forestry should be extended to ensure that salmon and steelhead trout habitats will be restored and protected from the adverse effect of man's activities. Sections 1601 and 1602 of the State Fish and Game Code should be amended to provide for the denial of permits by the Department when a request would adversely affect the fish and wildlife resources of the State. Where spawning areas cannot be restored, appropriate mitigation measures (such as the building of additional fish hatcheries) should be employed. [L-p6b]
- b. Systematic Stream Surveys Needed. The Department of Fish and Game should be adequately funded and staffed to systematically survey anadromous fish streams to determine fish populations, to identify and delineate critical spawning habitat (and associated riparian vegetation), its conditions, and its potential for improvement, and to develop and undertake appropriate management and restoration programs. Appropriate maps and reports should be forwarded to the California Division of Forestry to effectuate those provisions of the Forest Practice Act relating to stream protection and to

appropriate agencies, including local agencies, for control of polluting discharges. [L-p6c]

23. Protect and Restore Sand Supply and Movement. In addition to the regulatory functions described in Policy 21 (regarding stream-blocking structures) and Policy 18 (regarding shoreline structures), the coastal agency shall give overall direction to a program to conduct ongoing studies of sand supply and movement and to undertake restoration measures to maintain positively balanced sand budgets, [G-p8] including development of sediment bypass techniques, monitoring sediment buildup behind dams, and other methods for providing continued beach sand replenishment. [L-p5RA] The appropriate technical resources of agencies such as the U.S. Geological Survey, U.S. Army Corps of Engineers, State Department of Water Resources, Department of Navigation and Ocean Development, Division of Mines and Geology, State Lands Commission, and Department of Parks and Recreation, universities, colleges, and marine laboratories should be utilized in this program. [L-p8 and from G-p8b]

Water Supply Management

FINDINGS

Groundwater and Surface Water Are Interrelated. Groundwater and surface water are naturally interrelated. Surface waters recharge groundwater supplies and groundwater often feeds springs and streams. Over-exploitation of surface water will prevent adequate recharge of aquifers, especially where stream flow is important in recharge. Overuse of groundwater can affect surface supplies by drying up streams and springs fed by the groundwater and can adversely affect the groundwater supply by drawing in saltwater. This can often have a damaging effect on the native habitats that depend on this water supply. At present, there is no effective coordinated environmental management of groundwater and surface water resources. [I-f21]

Groundwater Supplies Are Recharged from Many Sources. Groundwater supplies are recharged by precipitation, seepage from rivers and streams, absorption and storage of rainfall by soils, and in some cases from underflow from adjacent areas. The rate of recharge is dependent on the type of soil, density of vegetation, intensity of rainfall and terrain, buildings, coverage with impermeable surfaces, and compaction of soil. The recharge area of an aquifer (water supply) can be reduced by development that decreases the rate and area of permeability for recharge, by compaction of soil, and by channelization of rivers and other flood

control projects. The underground geology of an area must be well known in order to have a clear understanding of the recharge and movement of groundwater.

Overdraft of Aquifers Has Adverse Effects. If an aquifer is overdrafted, in addition to the adverse effects on surface waters noted above, the geologic structure of the aquifer itself (especially in thick clay formations) may be changed. The aquifer may lose its future water storage and structural capacity through subsidence or compaction. Subsidence, an actual sinking of the ground surface can also cause damage to roads, buildings, and other structures. [I-f22]

Overdrafts Also Threaten Water Quality. As a result of continuing overdraft of groundwater supplies and the reduction of freshwater recharge, saltwater has intruded into underground freshwater reservoirs. Natural causes, such as long periods of low rainfall, may also contribute to saltwater intrusion, but are relatively insignificant compared to man-induced causes. Saltwater intrusion contaminates the water supply and can harm soil quality for agricultural use by increasing the level of various salts with continued irrigation. [G-f25] The quality of the water can also be damaged by septic tank effluent, buildup of nitrates and pesticides from irrigation water and other pollutants. [I-f22]

Effective Groundwater Management Is Needed. Because of these potential development impacts, it is crucial in effective water resources management to prepare and use accurate maps showing the geology of the groundwater basins and their recharge areas. The impact of development, both in terms of the amount of groundwater to be drafted and the effect on groundwater recharge should be assessed in terms of this geologic information. [I-f22]

Alternatives to Groundwater Drafting Should Be Developed. To offset the continued depletion of water supplies (both surface and groundwater), alternative sources will be needed. Importation of water and use of reclaimed water are the main sources. [from I-f23] Reclamation of waste water can help conserve limited water supplies, thus avoiding the potential adverse effects of overdrafts, including the problems of subsidence and saltwater intrusion. It can reduce California's dependence on costly and environmentally disruptive interbasin water transfers. Reclamation of waste water can also eliminate the adverse effects of disposing of partially treated waters into coastal waters. [from M-f9RA] In many areas the use of reclaimed water is preferable to importation because agricultural water costs (at lower than drinking water standards) may be stabilized or even lowered (in contrast with the often higher cost of imported fresh water), because water importation may entail high energy costs, and because water importation may in some instances induce development in coastal resource areas. [I-f23] On the other hand, in some coastal areas the initial quality of the water may be so poor as to preclude its reclamation for beneficial uses. [new]

Water Injections May Be Able to Correct Saltwater Intrusion. Saltwater intrusion can usually be alleviated, either by reducing overdrafts that lower the water table or by creating a freshwater barrier (by injecting water into wells located along the coast to raise the water level above sea level). Freshwater injections can also replenish underground reservoirs for continued use from inland wells, but they may be expensive and require consideration of complex hydrologic conditions. [G-f25]

Water Conservation Reduces the Problems Associated with Increasing Water Supply. The adverse economic and environmental effects of overuse of water supplies can all be reduced by lowering the rate of growth in demand for water use. Much water

use is inefficient or unnecessary, such as overwatering of agricultural and landscaping areas, planting non-native vegetation that requires more water, and use of inefficient plumbing fixtures. [new]

POLICIES

24. Relate Water Management to Coastal Protection. Water supply development, wastewater reclamation, and water conservation should be related to comprehensive watershed management. Coordinated programs at local, regional, and State levels are required: [from I-p21, 22]

a. Local Water Plans Should Stress Reclamation and Conservation. Water service agencies should develop comprehensive local water management plans based on a thorough inventory of surface and sub-surface supplies, coordinated wastewater management, and conservation of water resources, consistent with regional basin plans and with the Coastal Plan. Wastewater management programs and water conservation measures should include the reclamation of waste water, especially for non-domestic uses, restructuring of user charges to discourage unnecessarily high consumption, monitoring of private wells, and public education. [I-p21]

b. Local and Regional Water Management Plans Should Prevent Adverse Impact.

Both local and regional water management programs should prevent adverse effects on coastal resources with particular regard for the following:

(1) saltwater intrusion having adverse impacts on agriculture, wildlife, or other resources; (2) loss of natural riparian vegetation that has significant value for erosion control, flood restraint, and wildlife habitat; (3) adverse alteration of saltwater-freshwater balance in coastal wetlands; (4) degradation of anadromous fishery resources; (5) reduction of coastal sand supply where needed for protection against coastal erosion, for maintenance of recreational beaches, or for industrial sand supply; (6) loss of water-oriented summer recreational opportunities on specified streams; and (7) reduction of existing agricultural production and processes.

[I-p22] (See also previous section on Coastal Streams and Watershed Management.)

- c. Local General Plans and Building Codes Should Include Conservation. Cities and counties should incorporate water conservation in both their planning and building code programs. [M-p6d] The Legislature should mandate that all local general plans include an element that specifically addresses water conservation. Appropriate alternatives for recycling and conserving water should be implemented. [G-p10]
- d. State and Regional Water Plans Should Be Reevaluated. The Department of Water Resources should be adequately empowered and funded to gather and disseminate information on water use and supply, to research and implement regional and statewide programs for water conservation and reclamation, and to assist in local programs. [G-p10] State water policies and research should be reevaluated to reflect the benefits of water reclamation. [M-p6d] (See also Policy 7 regarding reclamation of waste water.)
- e. Prevent Saltwater Intrusion. The freshwater supplies within coastal ground basins shall be protected from seawater intrusion by injecting water into wells to create hydrologic barriers, or other proven techniques where necessary. High priority in the planning of such projects shall be given to the use of reclaimed water to the extent possible consistent with appropriate water quality and health standards. [G-p10]

Regional Amplification

South Coast: High priority for implementing reclamation programs within the State shall be the South Coast Region as it is the State's largest consumer and importer of water and the largest ocean discharger. A joint powers agreement between the Metropolitan Water District, the Los Angeles Department of Water and Power, and the Los Angeles County Sanitation Districts shall be entered into to develop a coordinated plan of water reclamation and reuse. [M-p6RA]

- 25. Development Decisions Should Relate to Water Management Plans. Development decisions shall be related to water management plans and programs that minimize the need for interbasin transfers and that consider total water basin impacts.

- a. Avoid Need for Future Water Importation. Development that has the potential, individually or cumulatively, for inducing the future importation of water shall not be permitted unless local, regional, or State water plans that have been determined to be consistent with the Coastal Plan provide for such importation. [I-p21]
- b. Development Should Not Adversely Affect Local Water Resources. New development shall be allowed to make demands on local water supplies only if it can be demonstrated that no adverse impacts will be generated, either directly or indirectly, on coastal zone resources (e.g., degradation of anadromous fish runs, saltwater intrusion into groundwater supplies, reduction of groundwater recharge). In addition to other policies of the Coastal Plan, the impact of development should be evaluated in terms of potential effects on the subsurface geology of underground water supplies and on the capabilities of surface drainage for water supply replenishment. Impervious surface limitations, floodplain zoning, and other development standards designed to protect groundwater and surface drainage areas shall be established at the local or regional level before development with the potential for adversely affecting water supplies is allowed. [I-p22]

Natural Habitat Areas

FINDINGS

Important Habitat Areas Are Found in the Coastal Zone. Many and varied species of animals and plants make their homes in the natural environment of California's coastal zone. Each living community harbors a distinct group of birds, animals, and plants, which interact with each other and their environment as a complex, often unique ecosystem. Some of the types of living communities (ecosystems or habitat areas) in the coastal zone are: dunes, wetlands (including salt and freshwater marshes and associated vegetation), riparian (banks of water bodies) vegetation, tidepools, redwood and other forests, coastal scrub and sage, and grasslands. Many species of animals range through several ecosystems for diverse food and shelter and some plants are found in more than one type of ecosystem. But many species can survive only in one such ecosystem. [I-f2]

Coastal Zone Natural Areas Provide Benefits to People. The various natural areas within the coastal zone are utilized by people for food and fiber production, for enjoyment, for recreation as varied as bird watching and hunting, for scientific investigation and experimentation, and for education and training. [L-f3]

Many Human Activities Have Destroyed Coastal Natural Areas. Substantial destruction of natural areas along California's coast has been caused by such factors as expanding urban development, the noise and pressure of recreational activities, alterations of vegetative cover, and the indiscriminate use of pesticides. These activities are reducing the habitat areas available to all plants and animals and are threatening some species and some unique communities, which can exist only in limited areas, with extinction. The continued existence of abundant and varied life forms on the coast depends upon proper safeguards for whole living communities as well as for plant and animal habitats. An especially serious problem in coastal zone wildlife management is the degradation or reduction of wetlands, tide pools, and dunes--the narrow and often fragile transition zone between marine and terrestrial ecosystems. [L-f4]

Unique Habitat Areas and Rare Species Need Protection. Public land ownership, including wildlife refuge areas and parks, preserves many habitat areas, but much of the unique natural area of the coast is still unprotected. The State Department of Fish and Game has some regulatory power to protect habitat areas of rare and endangered animal species and to restrict hunting of threatened animals. Rare and endangered plant species have recently been extended some limited protection on the Federal level, but no protection for rare and endangered living communities now exists. Moreover, there is limited, if any, regulatory power to assure that more living communities, and individual plant and animal species, do not become rare and endangered in the future. [L-f5]

POLICIES

26. Preserve Significant Natural Areas and Rare Species. Ecologically significant areas of all coastal natural living communities shall be preserved by public ownership or other appropriate means. [L-p1] (See Policy 88 regarding the establishment of coastal reserves to protect such habitat areas and Part IV, maps and notes, for identification of areas.) Rare or endangered plants (such as old-growth Coastal Redwoods and Torrey Pines), animals, and communities shall be protected from destruction or further degradation, and restoration efforts shall be aggressively pursued. Activities shall be restricted and public access shall be carefully managed to prevent any disruption of the habitat values. New legislation to assist in the designation, preservation, and restoration of rare or endangered plants and communities (habitat types) should be adopted, patterned after or expanding existing laws mandating protection for endangered species.

[L-p3]

27. Restrict Use of Fragile Habitat Areas. Natural habitat areas that are fragile, such as tidepools, sea caves, coastal wetlands, indigenous dune plant habitat areas, and riparian habitat areas, shall be used only for those activities that are directly dependent on these natural resources and only to the extent to which it can be demonstrated that no significant disruption of habitats or environmental damage will occur. [R-p5a] (See also Recreation section on Controlling Recreation to Protect Resources.)

Regional Amplification

Central Coast: Until acquired or otherwise protected, access across dunes which are stabilizing shall be limited. Further, no future-development shall be allowed that may adversely affect "living" Flandrian dune formations. [L-plRA]

28. Control Adjacent Development. Development in areas adjacent to significant or fragile habitat areas shall be controlled carefully to prevent adverse impacts which may significantly degrade the qualities of those areas. [L-p1] Specifically:

- a. Priority for Complementary Uses. Priority shall be given to proposed developments or uses that are complementary to wildlife uses, such as grazing lands that serve as auxiliary feeding areas for protected wild fowl.
- b. Restrict Disturbance of Shoreline Habitats. No development or use proposed along the coast or adjacent uplands that unnecessarily disturbs or destroys shoreline and intertidal habitats or dune vegetation shall be permitted.
- c. Maintain Buffers to Protect Habitat Areas. Development, including new divisions of land and construction on existing lots, shall be regulated to maintain a natural vegetation buffer strip as necessary for protection of habitat areas, but in no case less than 50 feet wide except for minor intrusions upon natural vegetation, along all intermittent and perennial rivers, streams, lakes, lagoons, and wetlands in the coastal zone. [L-p4]

29. Minimize Habitat Damage Wherever Development Is Permitted. Where permitted in or near any area with natural habitat value, urban development, roads, log-

ging, farm operations, or other human activities that reduce or affect natural areas shall be regulated to minimize the amount of natural land and vegetation that is altered and to strictly avoid unnecessary impact of such activities on these life resources. [L-p4]

Agriculture

FINDINGS

Coastal Zone Soil and Climate Create Special Conditions for Agriculture. Particular combinations of soil and climate along the coast create special conditions which are required by certain "coastal-dependent" crops and provide high productivity for other "coastal-related" crops and for general agricultural uses. The moderating marine influence extends the effective growing season, provides timing advantages for national markets, and reduces the dangers of large-scale crop loss from freezing. Crop adaptability maps are available to demonstrate the broad categories of crops suitable for particular areas, combining information from the Department of Water Resources land classification maps with climatic data. The rich soil resources of the coastal zone are not limited to the production of specialty crops, and in the event of need, agricultural production could be converted to staple crops. Many of the soils could grow varieties of wheat, oats, and other basic cereals, vegetables, and many other necessary crops. [L-f11]

Type and Extent of Coastal Agriculture. Over $3\frac{1}{2}$ million acres are now being used for agriculture within the coastal counties, with about 340,000 of this acreage used for principal coastal-dependent and coastal-related crops (24 fruits and vegetables). The balance is used for irrigated or non-irrigated pastures for sheep and dairy and beef cattle. Some pasture lands could be converted to specialty crop-producing areas if market, financial, climatic, and water supply conditions were favorable. Even for grazing uses, coastal lands enjoy unusually high productivity. Coastal-related agricultural lands may extend far beyond the present 1,000-yard permit line. [L-f18]

Much Coastal Agricultural Land Is Prime. Much of the coastal agricultural land is considered prime by USDA Soil Conservation Service Standards and by the broader definition, including economic factors, used for the State's preferential tax program, the Williamson Act, as follows:

- (1) All land which qualifies for rating as Class I and Class II in the Soil Conservation Service land use capability classifications.
- (2) Land which qualifies for rating 80 through 100 in the Storie Index Rating.
- (3) Land which supports livestock used for the production of food and fiber and which has an annual carrying capacity equivalent to at least one animal unit per acre as defined by the U.S. Department of Agriculture.
- (4) Land planted with fruit- or nut-bearing trees, vines, bushes, or crops which have a nonbearing period of less than five years and which will normally

return during the commercial bearing period on an annual basis from the production of unprocessed agricultural plant production not less than \$200 per acre.

- (5) Land which has returned from the production of unprocessed agricultural plant products an annual gross value of not less than \$200 per acre for three of the previous five years. [new]

Non-Prime Lands Are Also Valuable. Lower quality soils can also be valuable for producing crops with special climatic requirements, such as avocados, brussels sprouts, broccoli, artichokes, and celery. Grasslands constitute a major renewable resource converted to milk, meat, and other products on a short-term basis. [L-f18]

Coastal Agriculture Is Economically Important to California. Coastal agriculture provides many jobs. Estimates are as high as 350,000 jobs in and serving agricultural operations within five miles of the coast. Agriculture and food processing employment is substantial in some counties (e.g., Santa Cruz and Monterey). Gross revenues from agricultural crops are a major portion of the State's economy. In 1969, the value of the 24 principal coastal crops in the 15 counties was estimated at almost \$500 million--more than half of the State total for these crops. Nationwide coastal crops are important economically and as food supply. [L-f19]

Urban Development Threatens Coastal Agricultural Lands. Vast areas of agriculturally productive lands have been lost to urban expansion. More than eight per cent of the croplands in the coastal counties in 1958 were lost in the succeeding decade. Although some recent studies indicate that public revenues from agriculture are greater than public costs, the traditional concern for an expanding economy, employment, and tax base, combined with current tax assessment policies, continue to give precedence to urban development. Urbanization pressure causes other problems for agriculture: subdivisions and lot splits fragment land and ownership patterns, making some farm operations less practical; high land costs and taxes increase operating costs; residential development near agricultural areas brings complaints about farm dust, odor, pesticides, and noise, while it increases the problems of vandalism, trespass, dogs and other animals, and air pollution that adversely affect agriculture. [L-f20]

Retention of Coastal Agricultural Lands Provides Many Benefits. A growing public desire for open space to limit urban sprawl, combined with well publicized food shortages, price rises, and balance of payment considerations, have spurred public interest in preserving agricultural production areas. Projections of future food needs--and the lesser efficiency or impossibility of growing many crops outside the coastal zone--make existing coastal agricultural lands a natural resource of statewide and national concern. Fuel and fertilizer shortages, and the probability that future yield increases will be relatively small and achieved only through energy-demanding techniques, add to the value of naturally fertile coastal lands. Retention of agricultural land, whether for specialty crops or less intensive grazing, not only helps provide food but can also guide urban growth, reduce public expenditures for urban service extensions, preserve open space and wildlife habitats, provide beneficial use of land that is hazardous or inappropriate for other types of development, and maintain future land use options, such as conversion of grazing lands to more intensive crops. [L-f21]

Agriculture Also Has Adverse Effects that Require Control. Agricultural operations may have such adverse effects as introduction of toxic pesticides and

nutrients leading to eutrophication of watercourses, removal of large areas of native vegetative cover (common in the development of citrus and avocado orchards), and heavy drafts on surface and groundwater supplies. [L-f18]

Additional Preservation Measures for Coastal Agriculture Are Needed. Some agricultural preservation measures are now in effect in California, but new and expanded techniques and increased public awareness are needed to preserve valuable production areas. Local and State efforts to preserve agriculture are hampered by the lack of a Federal agricultural land policy, although the agricultural lands are a national resource. Existing laws are generally deficient in providing for the preservation of valuable agricultural land. This problem is not unique to the coast, although perhaps more urgent due to high urbanization pressures. Further revision of State and local tax assessment policies, strengthening of the Williamson Act (for instance, by authorizing the coastal agency to designate preserves), revision of State and Federal inheritance taxes, a "land gains" tax on land sale profits, or other techniques to discourage land speculation should be investigated. Development easements, development rights transfers, or purchase-leaseback arrangements (scenic lands could be leased for limited grazing) could offer semi-permanent public protection of agricultural lands. Loan programs (such as long-term low-interest loans for capital improvements needed to meet environmental quality regulations) and subsidies may also be necessary to maintain the economic viability of agricultural operations, as might the mandatory application of protective measures by local jurisdictions (for example, by requiring local governments to zone prime agricultural lands for exclusive agricultural use). [L-f22]

POLICIES

30. Preserve Prime Agricultural Lands. All prime agricultural lands (as defined in the Williamson Act, Government Code Section 51201) and all lands now being used or appropriate for producing coastal-dependent and coastal-related crops shall be maintained in agricultural use [L-pl2] except (1) where conversion is required for public service facilities such as airports, roads or coastal trails, energy facilities, or mineral extraction after it has been conclusively demonstrated that the proposed facility or activity is necessary and is consistent with other Coastal Plan policies, and there is no alternative location that would result in less environmental damage; [from I-p2 and new] and (2) small parcels within already urbanized areas, as provided in Policy 35. Where permitted, any such facility shall be sited and designed to minimize impact on resource areas. [L-pl2]

Regional Amplifications

South Central: In this region, many of the prime lands threatened by growing urbanization that shall be protected are: the Oxnard Plain, Ventura, Carpinteria, Goleta, and Oceano. A shift to greenhouse agriculture and to non-food production should also be considered by the coastal agency. [I-p5RA]

San Diego: Because of the unique dependence of floriculture activities on locations along the North San Diego County coastline; because of the community character and visual amenities they provide; and because of their importance in State and national flower and bulb protection, these uses shall be preserved and protected. [L-pl2RA]

31. Maintain Non-Prime Agricultural Lands. Non-prime coastal lands that are now in use for agriculture or grazing, or that are suitable for use as agricultural or grazing lands, shall be protected for productive use and their open space values retained. The conversion of such lands shall not be permitted unless (1) it can be clearly demonstrated that continued or renewed agricultural use of the parcel is infeasible because of the location, size, soil type, or other characteristic, or (2) as specifically provided for prime agricultural lands above. [L-pl3 and R-plb] If the infeasibility is economic in form, before conversion is permitted all types of public subsidy and public acquisition and probable future needs for agricultural production should be examined. This should include the possible recombination of small parcels into larger units where agriculture can be profitably practiced. Such determination of infeasibility for continued or renewed agricultural use shall be made after consultation with local agricultural producers and appropriate professional advisors. The proposed alternate use must be fully consistent with other Coastal Plan policies. [L-pl3]

Regional Amplifications

Central Coast: Because of the special value of all agricultural lands within this region, their limited supply, and their significant contribution to the regional economy, non-prime agricultural lands shall be preserved unless it can be clearly demonstrated that there is no possible alternative location for a conflicting use. [L-pl2RA]

South Central: Use changes of non-prime agricultural lands, including grazing lands, on coastal terraces and hillsides between Ragged Point and Morro Bay, south of Montana de Oro State Park, and intermittently

through Santa Barbara County to Ventura, such as erosion-prone conversions to avocados or development of energy-related facilities, shall also be given special consideration by the coastal agency. [I-p5RA]

32. Permit Only Agriculturally-Related Development on Agricultural Lands. Except for facilities approved pursuant to Policies 30 or 31, new development on productive and potential agricultural lands shall be limited to construction necessary for farming and timber harvesting such as farm buildings, farm worker accommodations, farm and lumber service facilities, farm and lumber roads, or other uses attendant to an agricultural or timber-harvesting economy. Even those developments, however, shall be located within rural communities unless such a location can be demonstrated to be infeasible, and shall be sited and designed to minimize impact on coastal resource areas. [I-p2]

Regional Amplifications

North Central: Local jurisdictions should provide for control over agricultural pollutants. [L-p15RA]

South Coast: Local jurisdictions may determine the type of agricultural activities permitted (i.e., light agriculture--nurseries, ornamental plants, row crops, etc., vs. heavy agriculture--feeding operations, grazing, etc.). [L-p14RA]

33. Limit Division of Land Within Agricultural Areas. Subdivisions and lot splits shall not be permitted to reduce agricultural parcels to a size that could be uneconomic or impractical for continued agricultural production. Where divisions of agricultural lands are allowed for agricultural purposes such as long-term leasing of specific parcels, the approval of such divisions should be conditioned on the recording of appropriate restrictions precluding the future division of the parcels and limiting the use of the parcels to agricultural activities. [L-p14]

34. Regulate Development and Land Division Near Agricultural Areas. New development or land division shall be allowed adjacent to existing or potentially productive agricultural lands only if it can be demonstrated that (1) it will not interfere with

continued agricultural use; (2) it is designed to avoid conflict with farming practices (e.g., clustering housing as far away from agricultural spraying areas as possible); and (3) it does not have an adverse economic effect on the long-term preservation of agricultural lands (e.g., adjacent lands are under agricultural use restrictions). [I-p4 and from L-pl4]

35. Specifically Designate Use of Remaining Agricultural Parcels in Highly-Developed Areas. Specific agricultural-urban use designations shall be made on a parcel-by-parcel basis as part of the subregional planning process (see Policy 183) for the numerous small isolated parcels (10 acres or less) of vacant prime agricultural land or land usable for coastal-dependent or coastal-related crops that exist within highly developed areas. (Highly developed areas are those where 80 per cent of the land area within one-half mile of the parcel is developed to a density of at least four residential units per gross acre or developed to 80 per cent of the maximum zoned commercial or industrial uses.) [E-p5]

a. Criteria for Designation. The designation of a parcel for either agricultural or urban use should consider at least each of the following: (1) the long-term agricultural production yield potential of the parcel in question; (2) whether the parcel can be combined with adjacent or nearby agricultural parcels for agricultural purposes; (3) energy, transportation, and water costs compared with inland areas where the same crops are grown; (4) potential for generating development pressure on nearby agricultural parcels; (5) the absence or presence (for five years or more) of agricultural-urban use conflicts and the severity of such conflicts; (6) whether the parcel could provide recreational uses; and (7) whether the conversion of the parcel to urban development would further other Coastal Plan policies (e.g., concentrating development in existing urbanized areas).

b. Designated Parcels Should Remain in Agricultural Use. If a parcel is

designated for agricultural use, the designation shall be for a time period of not less than 10 years.

- c. Prevent Conversion Prior to Making Specific Designations. Prior to adoption of subregional plans, parcels or contiguous areas of prime land that are five acres or more in size and have been in agricultural production for at least two seasons in the past 10 years shall not be converted to development in whole or in part; conversion of other small-parcel agricultural land within a highly developed area shall be allowed only in accordance with Policy 30. [I-p5]

Regional Amplification

South Coast: Publicly owned lands that are surplus lands not needed for recreation or other public purposes shall be maintained in public ownership and shall be used for producing specialty crops when feasible and where the land is neither a natural habitat area nor is suitable, because of size or location, for public open-space recreational purposes. [L-p14RA]

36. Provide Programs for the Protection of Agricultural Lands. High priority shall be given to appropriate regulatory, taxation, and research programs to assist in preserving and maintaining productive agricultural uses. Those considered should include State, regional, and local land use controls to prevent unwarranted conversions of land, strengthening of the Williamson Act, strengthening of subdivision regulations, a land gains tax, inheritance and income tax changes, development easement or purchase-leaseback techniques (ideally used prior to urbanization pressures), farm loans or subsidies, encouragement of multiple use of farmlands, and research in new crop strains, pest control management, agricultural pollution control, the use of reclaimed water in agriculture to avoid overdraft of coastal aquifers and possible saltwater intrusion (see also Policy 24), and long-term land management practices designed to avoid soil erosion or soil degradation. [L-p15] Agricultural practices that minimize soil loss, such as contour plowing, shall be encouraged; [L-p11] where severe erosion or soil depletion is occurring,

governmental agencies should be authorized to require range improvement practices.

[L-p15RA] Acting in accordance with Article 28 of the State Constitution, which establishes the importance of agricultural soils for the production of food and fiber and as an economically viable way to retain land in open space, the State should provide permanent protection of valuable lands through legislative action and should require the application of such protective methods by local jurisdictions. [L-pl5] (See also Part III. Specific recommendations will be part of the final Coastal Plan.)

Forestry

FINDINGS

Commercial Timberland Is a Valuable Coastal Resource. The commercial timberland of the coastal zone is a valuable natural and economic resource. It must be managed carefully to ensure its maintenance as a renewable economic resource, to retain its valuable wildlife, fisheries habitat, and scenic and recreational potential, and to protect watersheds from erosion and excessive runoff due to the removal of vegetation. [L-f23] The California Forest Practice Act of 1973 has as major objectives the maintenance of commercial timberland to ensure long-term sustained yield, and the protection and enhancement of fish and wildlife habitat, soil and watershed resources, and recreational use of timberland. [L-f24]

Improper Management Has Reduced Forest Resources. In the past, unsound forest management practices, conversions of timberland to other uses such as residential development or agriculture, and site dominance by non-commercial successional species have contributed to the decline in the historical timber inventory in California. [L-f24] Land division activities have produced small uneconomic parcels that force the harvesting of timber when it is not desirable. [L-f25]

Revision of Timber Taxation Methods Is Needed. Current methods of timber taxation, which treat most mature standing timber as "property," encourage unsound forest management on small timber ownerships, resulting in reduced forest yield. Revision of present timberland taxation practices (for example, replacing the property tax with a "yield tax" that would tax the timber as it is removed) is needed to encourage conservation and long-term renewal of this resource. [L-f25]

POLICIES

37. Protect Coastal Forest Resources. Forestry resources should be managed as part of comprehensive watershed management, as set forth in Policy 19. In addition, the coastal agency shall regulate timber harvesting and timberland conversions

on a case-by-case basis to maximize protection of the public interest while allowing appropriate utilization of this important renewable resource. The following criteria shall apply to all timber harvesting in the coastal zone: [L-pl6]

- a. Restrict Conversion of Timberlands. Conversions of high-quality redwood, Douglas fir, or other coastal commercial timberlands (site I, II, or III) to other uses or their division into non-commercial size units shall be prohibited, except for necessary timber processing and related facilities (see Policy 32) and for specific uses that may be permitted as provided in Policy 30 for prime agricultural lands. [L-pl6a] Other coastal open spaces now in use for forestry shall be protected for productive use and open space value except as provided for non-prime agricultural land conversion (see Policy 31). [R-pl]
- b. Protect Scenic Qualities of Timberlands. Coastal timberlands with high scenic value visible to coastal visitors from public roads, foot and bicycle trails, coastal rivers and streams, beaches, or parks shall be identified and mapped, and timber harvesting, including road construction and debris removal, shall be regulated to protect these scenic qualities. [L-pl6b] Buffer areas shall be preserved to effectively screen new logging operations from such public viewing points. [A-pl6a]
- c. Protect Water Quality from Adverse Effects of Logging. Timber harvesting in key watershed areas and along stream banks shall be strictly regulated, with specific "buffer zones" established (with assistance from water quality, wildlife, and fisheries agencies) where no harvesting of timber will be allowed. (Key watershed areas, and where possible the depth of required "buffer zones," will be identified in the final Plan.) Watershed areas that are vital to the water supply of coastal communities shall be identified, and forest management practices within these areas shall recognize the local importance of these water supplies.

38. Restore and Enhance Timber Resources. Programs for rehabilitation and enhancement of commercial timber resources should be developed, subject to approval of the coastal agency, with State financial assistance, and implemented according to priorities developed as part of watershed plans. [L-p16d]

39. Modify Taxation to Encourage Sustained Yield. The coastal agency shall work aggressively to ensure that State laws governing taxation are modified as appropriate to encourage a sustained yield basis for timber production. [L-p17]

(Specific recommendations will be a part of the final Coastal Plan.)

Soil and Mineral Resources

SOILS

FINDINGS

Soils Are Important to Coastal Resources and to Development Decisions. Soils are a valuable and irreplaceable coastal zone resource that form the basis for all land-based activities, absorbing and storing rainfall that recharges underground aquifers, sustaining agriculture and timber production, and supporting natural vegetation, wildlife habitat, and other uses of the land. Soils map inventory the distribution, quality, and limitations of the land. Such maps can aid in land use planning and in review of development proposals by identifying areas of prime soils for agriculture and timber production and areas with potential soil erosion, waste disposal, instability or other problems. Several coastal counties have already completed detailed soils surveys. Data presently available includes Department of Water Resources surveys classifying California lands for suitability for agriculture in terms of slope, soil texture, and other limiting characteristics. Major land use categories, including urban development, agriculture, and certain types of recreation, are being mapped periodically to determine changes in land use. Most of the coastal areas have been mapped twice at an interval of about ten years, which demonstrates land use trends. [L-f16]

POLICY

40. Protect Coastal Soil Resources. Soil productivity shall be protected and development regulated to prevent soil depletion or degradation. Existing building and grading regulations aimed at minimizing erosion shall be strengthened and strictly enforced, including review of local ordinances by the coastal agency to ensure that such ordinances are in full conformance with the Coastal Plan. To this

end, natural resource inventories, including detailed soil surveys, should be completed for the entire coastal zone and used to identify valuable soils that should be protected when formulating land use plans and evaluating proposed projects.

[L-p11]

MINING

FINDINGS

Several Non-Petroleum Minerals are Extracted in the Coastal Zone. California's coastal zone contains many non-petroleum minerals; sand and gravel are the most important economically. Construction material needs can be largely met by mining non-coastal mineral deposits, with the exception of specialty sand and other unique coastal minerals. Increased demand for non-petroleum minerals is leading to increased interest in offshore mining. Recent developments in offshore mining technology are helping to make offshore mining competitive with land operations. Seawater also holds promise as a source of more salt, magnesium, and other minerals. On land, the geographic sprawl of cities threatens to cover many mineral deposits, primarily sand and gravel resources located near urban areas. Also, urban residents often object to nearby mining operations. [L-f14]

Sand and Gravel Extraction Involves Environmental Hazards. Mineral extraction, primarily of sand and gravel, involves many environmental hazards. Open-pit mining removes all vegetation, creates disposal problems, may pollute both air and surface water, and deprives wildlife of habitat. Suction dredging (using vacuum pressure to recover underwater resources) disrupts bottom life, can pollute the water with silt and residual material, and can create dredge-spoil disposal problems. Dragline mining, which scrapes off surface materials with a bucket suspended from an arm, either on land or underwater, can cause the environmental damages of either open-pit mining or suction dredging. Sand and gravel extraction also can reduce spawning grounds. Mining of coastal sands has noticeably depleted this resource in some locations.

Mining Regulations Are Needed. Strict environmental controls, such as dredge disposal standards, dust and noise control equipment, and reclamation of pit mines, could alleviate many of the problems, although they would also increase mineral extraction costs. Some such regulation is now being done, but it is not uniform throughout the coastal zone. [L-f15]

POLICIES

41. Regulate Mining Activities. Mining shall not be allowed in sensitive areas like estuaries, marshes, lagoons, "living dunes," some streams, and other coastal water areas and landforms that are fragile, valuable natural environments. Mining shall be allowed in other coastal areas only if it can be demonstrated: (1) that the

minerals cannot feasibly be supplied from inland locations; (2) that the mineral extraction will not have a substantial or long-lasting adverse impact upon coastal zone resources; and (3), in the case of sand mining, that the sand supply of the of the particular watershed is sufficient or alternative sand supply provided to allow mining without adverse impact. [L-p9] (See also Policy 17 regarding dredging and spoils disposal, and Policy 21 regarding stream mining.) In addition:

- a. Provide Buffer Areas. Buffer areas shall be preserved to screen new on-land extraction operations from coastal roads, trails, water bodies, beaches, and recreation areas. [from A-p16a]
- b. Restore Mined Areas. After completion of permitted mining operations, mineral extraction areas shall be reclaimed and replanted in order to ensure slope stability, erosion control, and adequate drainage and to offer as natural an appearance as possible. [A-p16c] Where feasible, extractive sites shall be restored for future park or open space utilization. [L-p10]
- c. Establish Environmental Protection Standards. Noise and dust, surface water pollution, and waste materials and spoils disposal shall be controlled to minimize adverse impacts. Uniform statewide regulations should be adopted and enforced to provide appropriate standards for these impacts, as well as for reclamation of extractive sites. Implementing these requirements will require the cooperation of the many local, regional, and statewide agencies that would be involved, coordinated by an agency such as the State Office of Planning and Research or the coastal agency. [L-p10]

Regional Amplification

San Diego: Mineral extraction operations shall not be permitted to degrade highly scenic or visible areas and shall not permanently alter coastal visual qualities. [A-p16RA]

42. Inventory and Reserve Mineral Deposits. To reduce the pressure to mine sand and gravel and other non-petroleum mineral resources in fragile coastal areas,

the location, quantity, and quality of resource deposits should be inventoried statewide, concentrating on potential resources near urban areas where materials can be transported at reasonable cost. Near-city mines and reserves shall be protected from urban encroachment. [L-p9] Designating appropriate mining sites should be a part of comprehensive watershed management plans, described in Policy 19. [new]

Air Quality

FINDINGS

Clean Air Is a Coastal Zone Resource. Clean air is an identifiable resource contributing to needed economic activities in many coastal localities, such as cut-flower and specialty crop agricultural areas and recreational locations valued for their clear and healthful air. Clean air portions of the coastal also provide a needed refuge for people with asthma and other illnesses. Beyond these tangible benefits, the fresh ocean breeze is appreciated by residents and visitors throughout the coastal zone. [from L-f26]

Air Quality Varies Throughout the Coastal Zone. Air quality varies greatly among different portions of California's coastal zone. Pollution sufficiently severe to damage human health occurs in some locations (generally urbanized areas with adverse meteorological and topographic conditions) and contrasts with normally clean air in others. Studies made under Environmental Protection Agency auspices are increasingly quantifying the detrimental effects upon health of air pollution levels even under existing secondary standards. [L-f26]

Air Pollutants Originate from Many Sources. Air pollutants originate from many sources. Motor vehicles constitute the single largest source of nitrogen oxides, carbon monoxide, and organic gases; industry, including fossil-fuel electric plants, is the chief source of sulfur dioxide. Suspended particulate matter comes from mining, agricultural, and lumber operations, as well as from motor vehicles, incineration, the combustion of fuel. All these are in addition to natural sources such as dust and saltwater particulates. [L-f27]

The Distinct Climate of the Coast Affects Air Pollution. Several distinct meteorological aspects of the coastal zone affect air pollution problems. Temperature inversion layers, which trap pollutants by stopping upward air movement, tend to occur more frequently, at much lower levels, and last longer into the day along much of the California coast, due to high-pressure centers off the Pacific Coast or to land-water temperature differentials. Land-sea breezes are caused by the temperature differential between the land surface and the ocean surface, on both a daily and seasonal basis. These breezes may push pollutants back and forth without dispersing them throughout a larger area, especially where the topography helps trap pollutants and when winds are relatively weak, as they are in winter. During the summer season, the fog and low clouds along the coast usually prevent formation of photochemical smog, but as winds move the air inland, pollutants

produced in the coastal zone can contribute to severe smog at inland locations where the pollutants react with sunlight. Sulfur dioxide pollution is more dangerous in coastal fog areas, where chemical reactions can produce a weak solution of sulfuric acid, injurious to human, animal, and plant health, and damaging to many materials. [L-f28]

Air Pollution Threatens Coastal Zone Resources. Air pollution limits specifically set to protect human health are now being exceeded in some locations along the coast, creating not totally quantified but very real damage and human suffering. The extent of air pollution damage to wildlife and vegetation resources (including native plants, forests, landscaping, and agricultural crops) is increasingly being documented. A statewide study estimates crop losses alone from air pollutants in 1970 to be almost \$26 million, not including invisible damage. [L-f29]

Development Patterns May Affect Air Pollution. The location and intensity of air pollution concentrations greatly influence its effect. Studies suggest intensive transportation corridors are major sources of concentrated vehicle emissions creating a special hazard for humans, wildlife, and plants located nearby. When freeways encourage a net increase in vehicular mileage, they also add to total air basin pollution. Buildings also affect pollution dispersal, generally slowing wind speed over urban areas and modifying wind patterns within particular building masses. [L-f30]

Project Design Can Help to Minimize Air Pollution. Careful project design can minimize interference with wind currents, especially in local circulation patterns, and can thus maintain natural ventilation. Properly located vegetation barriers ("green belts") can substantially reduce particulate air pollution and some types of gaseous pollutants, especially near ground level, by trapping it on the foliage. Even a 30-foot-wide strip densely planted with trees and shrubs can filter out more than a quarter of some types of pollutants. Project designs which minimize automobile use also aid in reducing pollution. [L-f31]

Further Air Quality Regulations Are Needed. Present regulation of air pollution in California is shared among local air pollution control districts, the State, and the Federal government, and is coordinated by the State Air Resources Board. Present regulations focus on limiting pollutants emitted from stationary and vehicular sources. There is currently no authority to coordinate land use and transportation systems as a means to control air pollution, but this is now being proposed by the State Air Resources Board and the Environmental Protection Agency. Indirect source controls are also being developed. The Environmental Protection Agency is also considering limiting the extent of allowable degradation of existing air quality in any air basin, rather than setting only upper limits on total pollution levels. In addition to requiring each state to prepare and enforce a plan to meet the primary national ambient air quality standards, the Federal Clean Air Act also requires each state to prepare and submit by June 1975 an Air Quality Maintenance Plan showing how air quality standards will be maintained. [L-f32]

POLICIES

43. New Developments Shall Protect Coastal Air Quality. All new coastal development (including small-scale development that taken with other projects of the same type would have a cumulative effect upon coastal air quality) shall be de-

signed to protect and restore coastal zone air quality to the maximum extent possible. All developments that could have substantial air pollution potential shall be allowed in the coastal zone only if it can be demonstrated that there will be no significant degradation of air quality and no significant adverse effect upon coastal resources. [L-p18] Specifically:

- a. Major Pollution Sources. Major pollution-generating developments, including refineries, oil storage and separation facilities, freeways, new coal or oil-fired electric generating plants, and modernization or expansion of existing plants, shall meet all applicable Federal, State, and local air quality standards and all criteria specified in other Coastal Plan policies. (See also Transportation chapter and Policies 134 regarding electric power plants and 149 regarding refineries.) Such developments shall not be built in areas of the coastal zone designated by the Air Resources Board as critical air areas or in areas where coastal resources (such as resort or agricultural areas) would be adversely affected unless the coastal agency determines there is no alternative inland or coastal location where siting would result in less environmental degradation. Any approved project shall be designed and sited to minimize pollution, including use of best available technology. [L-p18a]
- b. Residential and Commercial Development. Additional residential development shall wherever possible be located in areas served by public transit systems. [L-p18b] (See Policy 166 regarding limitation on remote, auto-dependent developments.) Alternative transportation modes and reductions in total vehicle miles traveled shall be strongly encouraged in all new and existing developments by requiring financial contributions to public transit systems in lieu of parking spaces, through public subsidies of bus systems, by restricting arterial design capacities and on-site parking, or by other appropriate means. [L-p18d] (See also Transportation chapter.)

- c. Project Siting and Design. All new projects in the coastal zone shall be evaluated and appropriate mitigation measures required to reduce pollution problems (e.g., on-site open space, green belts, internal circulation systems, and buildings designed and sited to maintain favorable wind currents).

[L-p18e]

Regional Amplification

South Coast: Because of the critical levels of air pollution already existing in the region's coastal zone, new intense pollution-generating developments shall not be located in the coastal zone. Modernization and expansion of existing pollution sources shall be permitted provided that new emission levels are decreased for individual projects; however, as these sources become obsolete (e.g., due to technological considerations or as they attain their life expectancy) consideration shall be given to recycling to more coastal-dependent land uses. All new service station developments in this region of the coastal zone shall be required to install devices by which evaporative losses during fueling operations will be minimized. [L-p18RA]

44. Stress Maintenance and Restoration of Coastal Air Quality. The coastal agency shall work actively with existing agencies now preparing Air Quality Maintenance Plans for localities with air quality problems. Similar cooperation shall be exercised in developing air quality carrying-capacity estimates for each clean air region. The coastal agency shall also vigorously support the development and utilization of improved air quality technology for both stationary and mobile sources and development of improved means for assisting and evaluating air pollution technology. [L-p18c]

Manmade Resources

Special Coastal Communities and Neighborhoods

FINDINGS

Certain Communities and Neighborhoods Are Significant Coastal Resources. Certain communities and neighborhoods have particular cultural, historical, architectural, and aesthetic qualities that are as important to the coastal zone as are its natural resources. These areas are resources either because they have a physical coherence that complements the visual character of the coastal area, or because they provide significant opportunities for access to the coast through pedestrian orientation and through the provision of housing and recreation-oriented commercial facilities for a wide range of economic groups.

Special Characteristics of Such Coastal Communities. These resource areas include individual small coastal towns and coastal neighborhoods in larger cities that are characterized by orientation to the water, usually a small scale of development, pedestrian use, diversity of development and activities, public attraction and use of facilities, distinct architectural character, historical significance, or ethnic or cultural characteristics sufficient to yield a sense of identity and differentiation from nearby areas. Examples include such different coastal communities as the Ocean Beach and La Jolla areas of the City of San Diego and the community of Encinitas in San Diego County; the Naples area of Long Beach and the Venice area of the City of Los Angeles; the Pierpont Beach area of the City of Ventura; Summerland in Santa Barbara County; Morro Bay and Cayucos in San Luis Obispo County; Carmel; the town of Bolinas in Marin County; and the towns of Mendocino in Mendocino County and Ferndale in Humboldt County.

Careful Development is Required to Complement the Distinctive Qualities of Special Communities. As recreational and tourist attractions and as an integral part of the experience of the coast, distinctive coastal communities are of value to their residents and the public at large. Maintaining the qualities is dependent on maintaining the prevailing scale and mix of development. In some areas large-scale condominiums, townhouses, high-rises, shopping centers, and motel developments are replacing architecturally interesting and lower-density, smaller-scale uses, destroying special places and neighborhoods, displacing lower-income residents in favor of the more affluent, and increasing the level of traffic congestion in the community for residents and visitors alike. [I-f6]

POLICY

45. Protect and Enhance Special Coastal Communities and Neighborhoods. The unique cultural, historical, architectural, and aesthetic qualities of special

coastal communities and neighborhoods that contribute to the enjoyment of the coast shall be protected and enhanced. Developments that would alter the special qualities of these resource areas shall be regulated to protect and enhance the special qualities of such manmade resources. [I-p1b and I]p6]

- a. Identification of Special Communities and Neighborhoods. The special coastal communities and neighborhoods cannot necessarily be quantified or defined with absolute precision, but their distinguishing characteristics can be readily discerned throughout the California coast and can be found in only a limited number of places. These special coastal communities and neighborhoods which contain manmade resource qualities include any of the following: (1) areas characterized by a particular cultural, historical, or architectural heritage and continuity that is distinctive in the coastal zone; (2) areas presently recognized as important visitor destination centers on the coastline; (3) areas whose small-scale and limited automobile traffic provide opportunities for pedestrian and bicycle access for visitors to the coast; (4) residential neighborhoods that contain small-scale commercial areas that both serve and are located within walking distance of coastal recreation areas; (5) areas whose current physical scale is consistent with and complementary to coastal landforms or whose particular physical coherence adds to the visual attractiveness of the coast for residents and for the general public traveling to the coast; (6) areas that provide a diversity of coastal housing opportunities, particularly for low- and moderate-income persons and the elderly; or (7) areas within walking distance of a beach with generally over 20 per cent of all parcels in either hotel-motel or beach-oriented commercial uses. Normally such coastal neighborhoods and communities will be within walking distance of the coastline—roughly 1,000 yards—but in some cases they may extend further inland.

- b. Community Participation. As part of the subregional planning process recommended in Policy 183, residents of a special coastal neighborhood or community, perhaps organized in community advisory committees, should assist in determining the particular values of their area and how new development can be consistent with them.
- c. Restrict Inappropriate Development. Development out of scale, size, or social character shall not be allowed in designated special communities and neighborhoods. In determining the appropriateness of a proposed development, consideration should be given to intensity of use (e.g., lot size, unit size, residential composition, height, bulk), pedestrian accessibility, open space, economic and social factors, and the cumulative impact that potential development would have on an area's resources. [I-p6]
- d. Coastal-Dependent Uses and Access Facilities Desirable. Considerations of appropriateness of development should not preclude coastal-dependent uses or coastal access and visitor-serving facilities. [I-p6] In areas characterized by coastal villages in rural surroundings, visitor facilities should be limited in size and should not necessarily concentrate in any one village or location. [I-p9]
- e. Design Guidelines. Where permitted, new or expanded development in such communities and neighborhoods shall be designed to be compatible with the special values and character of the community and should avoid the overcrowding of access roads and local streets. [I-p6] Development shall (1) strengthen the physical form of the community or neighborhood, (2) enhance and restore visual qualities by being of a bulk, height, and color that is compatible with the existing character [A-p26a], and (3) harmonize with the essential design characteristics that distinguish the place from other communities (e.g., a rustic weathered or whitewashed appearance of the waterfront), and (4) protect ocean views from many

vantage points, [A-p26b] and (5) provide for maximum pedestrian circulation and shoreline access. Motels in rural coastal villages, for example, should be unpretentious in appearance (stereotyped motel-chain architecture should be prohibited) and should feature some small separate structures rather than large bulky facilities so as to complement the detached homes and small commercial buildings that characterize most such villages. [I-p9]

Regional Amplifications

Central Coast: Examples of special coastal neighborhoods and communities in the Central Coast Region include the northern Palisades area of Daly City; Sharp Park west of Highway 1, Rockaway Beach, Pacific Manor, Pedro Point, Shelter Cove neighborhoods of Pacifica; the Lighthouse Point, Beach Hill, and Yacht Harbor neighborhoods of the City of Santa Cruz; the Yacht Harbor neighborhood in Santa Cruz County; the Village and Esplanade area of Capitola; the Moss Landing Harbor area; the coastal area of Marina; the Oak Grove, Fisherman's Wharf, and Cannery Row neighborhoods of the City of Monterey; the coastal neighborhoods of Pacific Grove; downtown Carmel; and the Pebble Beach area of Monterey County. [I-p6RA]

South Central: Communities of special character in the South Central Region include but are not limited to: San Simeon, Cambria, Cayucos, Morro Bay, Baywood Park, Avila, Pismo Beach, Oceano, Isla Vista, downtown Santa Barbara south of 101, Montecito, Summerland, Carpinteria (from Carpinteria Ave. to the beach), the Rincon Beach communities, Pierpont Beach in Ventura, Hollywood and Silverstrand Beaches, and Oxnard Beach. [I-p6RA]

Historical and Archaeological Resources

FINDINGS

Archaeological Resources. The archaeological sites resulting from the thousands of years of human settlement along the coast are among the most fragile non-renewable resources in the coastal zone. Prehistoric California Indians kept no chronicles of their rich and varied cultures that spanned 100 centuries or more. Knowledge of their ancient heritage can be gained only from the detailed study of archaeological remains, the only source of information for over 95 per cent of California's cultural story. [R-f13] Also valuable are the paleontological resources, the fossilized remains of plants and animals contained in coastal rocks and sediments.

Historical Resources. California's rich cultural history is also a valuable heritage, and its traces are irreplaceable. The historical record of the Spanish, Russian, Mexican, and early American eras of California's past can be found in many historical buildings and sites along the coast. Many other buildings may have historical value as significant examples of architectural styles.

Protection for Archaeological Resources. Historical, paleontological, and archaeological sites are protected to some extent by existing laws. But pre-historic sites are often destroyed because their precise locations are not always known and because construction may be carried out without concern for their protection. On the other hand, public knowledge of archaeological sites often leads to their destruction by vandals when they are not properly protected. [R-f13]

Protection for Historical Resources. Historic and architecturally valuable structures may be destroyed because of insufficient protective measures but could be appropriately protected if maintained in use under private ownership. [R-f13] Even those historic areas that are designated or under active consideration as National Historic and Natural Landmarks (being sites of national significance) are, due to lack of protective State statute, now subject to adverse development at the pleasure of the owner. The same problem is apparent at sites of State and local significance. For instance, although the San Francisco Bay Discovery Site above Pacifica is now much more likely to receive sensitive treatment since its designation as a National Historic Landmark, Santa Cruz's McHugh-Bianchi building was recently demolished even though it too was listed on the National Register. Further analysis will be required to ensure that all areas of national, State, and local significance are considered for listing in the California History Plan as well as the National Register. [R-f13RA]

POLICY

46. Protect Historical and Prehistorical Resources. Representative and unique archaeological, paleontological, and historical features shall be identified and protected from destruction and abuse. [R-p11] These sites shall be permanently preserved through public acquisition or other means and shall be integrated with recreational and other cultural facilities where feasible. [R-p11b] To this end:

- a. Make Systematic Survey of Coast. The State Historic Preservation Officer (in conjunction with qualified professionals) should draw up a program for the systematic archaeological and paleontological survey of the coast. The program shall include a system of ranking site importance and level of protection necessary and shall give highest priority to surveying the following areas: (1) those areas where substantial information has been recorded but still require a systematic overview; (2) those areas of high "sensitivity" because suspected resources are endangered by proposed development; (3) those sites most likely to yield significant new information; and (4) those unsurveyed areas located within areas zoned and designated for near-future development. [R-p11a]

- b. In Interim, Require Professional Survey of Large Development Sites.
Until the State Historic Preservation Officer's survey is completed, large (3+ acres) parcels proposed for development shall be systematically surveyed by a qualified professional. The development of small parcels shall be permitted without professional survey unless the State Historic Preservation Officer has identified the property as having probable archaeological or paleontological value. [R-p11d]
- c. After Survey, Require Protective Measures at Resource Sites. Where development would adversely affect identified archaeological or paleontological resources, adequate mitigation measures (e.g., preserving the resources intact underground, fencing the resource area, or having the resources professionally excavated) shall be required. [R-p11d]
- d. Strengthen Laws Protecting Pre-historical Resources. Existing laws pertaining to protection of archaeological and paleontological resources should be amended to ensure effective preservation, protection, and management of significant resources. In addition, new legislation should be enacted to declare that significant archaeological and paleontological resources are in the public domain. The State Legislature, or an appropriate State agency designated by the Legislature, should: (1) formulate criteria for determining which resources are "significant" and therefore within the scope of the law; and (2) develop a program for the protection and, where appropriate, professional excavation and study of the resources. State funding should be provided to implement these programs. [R-p11e]
- e. Provide Tax Relief for Owners of Historic Places. Pursuant to Article XXVIII of the State Constitution, State legislation should be enacted whereby cities and counties can contract with owners to preserve historic buildings and features in return for reduced tax assessments. Sites of

national, State, and local historical importance shall be nominated to the National Register, and if designated for public acquisition should receive interim property tax relief and development protection. [R-p11c] (Historic areas of high scenic value are covered by Policy 48; see also Policy 88 regarding inclusion of appropriate sites in a coastal reserve system.)

Appearance and Design

FINDINGS

The Coast is a Visual Resource. For the most part, the California coastline is an outstanding visual resource of great variety, grandeur, contrast, and beauty, that can be enjoyed by all the people of the State. Visual attractions such as the dramatic meeting of land and water, clear skies, unspoiled natural areas filled with wildlife, and the rich texture of urban shorelines add to the quality of life for coastal residents, visitors, and workers, and contribute to the economic success of the tourist industry by attracting many vacationers to the coastline. [A-f1]

Complexity of Analyzing Coastal Visual Resources. The systematic analysis and management of coastal visual resources are complex and difficult because of the great variety of natural conditions and the wide spectrum of the degree of development along the coast. At the broadest level the following nine types of landforms (1 through 9) and three patterns of development (10 through 12) have been found to encompass most conditions along the coast; therefore, these are reasonable categories for statewide appearance and design policies and lend themselves to greater specificity based on detailed inventories of existing conditions and problems:

- (1) Beaches that may be narrow to broad sand, shingle, cobble, or rock with a wide degree of vegetation ranging from none to thick grasses, including the Silver Strand, Ten Mile Beach, and Stinson Beach.
- (2) Sand dunes that vary greatly in height and in the degree of vegetation they support, including Murray Dunes, Monterey Bay dunes, and Salmon Creek Beach.
- (3) Coastal bluffs that are the angular, irregular coastal edges of marine terraces rising at least ten feet above sea level, including Point St. George, Santa Cruz North Coast, and Goleta Point.
- (4) Headlands that usually fall steeply into the sea along a jagged angular, irregular shoreline, including Big Sur, Cape Vizcaino, and the Golden Gate Headlands.
- (5) Estuaries that encompass bays, lagoons, inlets, and their surrounding wetlands, including Bolinas Lagoon, San Dieguito, and Pescadero Lagoon.
- (6) Islands ranging from large rocks to the expansive Channel Islands, including Indian Island, Farallon Islands, and Santa Catalina Island.
- (7) Upland terraces and plains that are generally broad, flat coastal lands stretching inland from the sea to the coastal mountains, including much of the Mendocino Coast, San Mateo coastline, and the Irvine Properties.
- (8) Canyons and hillsides that are usually steep and rugged and include rare vegetation, small scale features, abundant wildlife, and outstanding visual features, including Bixby Canyon, Los Trancos Canyon, and San Clemente.

- (9) Rivers and streams that are the upland portion of estuaries that are connected to the sea and that are often meandering, broad open areas shaped by the paralleling hills, including the Smith River, Tia Juana, and Russian River.
- (10) Village waterfronts where residents live and work in the community with little, if any, reliance on commuting to other areas because a full range of community services and facilities are present. A small-scale of development and an atmosphere of close relation to the sea is often present because of an agricultural or fishing economy. Coastal villages include Morro Bay, Mendocino, Laguna Beach, and La Jolla. (Village waterfronts, for the most part, are classified as special coastal neighborhoods and communities; see Manmade Resources chapter for further findings and policies.)
- (11) Suburban waterfronts that are within commuting distance of major employment centers, predominantly residential with some supporting commercial and service facilities, and that have often grown around older coastal villages. They are the transition area between urban and rural areas and often contain remaining undeveloped areas including some agricultural lands and scenic open spaces. Coastal suburbs include Huntington Beach, Pacifica, and Belmont Shores.
- (12) Urban waterfronts that are developed with a full range of residential, commercial, industrial, and other uses--often with such intensity that the shoreline is obscured by development. Coastal urban areas include San Diego, Long Beach, Los Angeles, and San Francisco. [A-f2]

Deterioration of the Appearance of the Coast. In some areas, manmade changes have provided new access to the coast and new opportunities to enjoy the coast, while respecting the special visual quality of the coastal environment. But in other areas, the coastline has been degraded by new developments and other alterations that do not harmonize with the scenic qualities of natural areas or do not respect the unique visual resources found in developed coastal areas. In its most general terms, this deterioration is due to various aspects of urbanization that could have been better designed to minimize their negative effects. These issues include:

- (1) Scale, height, materials, and colors of buildings and structures that, when inappropriate to the landform and existing patterns and scales of development, can degrade the appearance of both communities and natural areas.
- (2) Community boundaries that are often ignored, creating visually displeasing "sprawl" development. (See Policy 164.)
- (3) Signs that can block views, create visual clutter, and deteriorate the appearance of otherwise attractive communities.
- (4) Alteration of natural landforms by cutting, grading, filling, or vegetation removal that can cause visual scars, result in unsightly erosion, and destroy scenic areas.
- (5) Landscaping that is often lacking in new development, creating the appearance of harsh structures imposed on the coastline.
- (6) Views that when blocked destroy the most important visual quality that identifies coastal areas.

- (7) Utility and communications facilities that can cause visual blight when overhead lines, towers, and poles intrude into scenic areas or clutter views of the coast in developed communities.
- (8) Public service facilities such as power plants, sewage treatment facilities, solid waste disposal facilities, water storage tanks, pumping stations, and power and communication substations that can be major visual intrusions in the coastal environment because of their size and appearance.
- (9) Transportation and parking facilities that can result in cutting and filling of the natural landscape and the well known "sea of asphalt" in urban areas. (See Transportation chapter policies on roads and parking lots.)
- (10) Industrial and commercial uses that can have a major visual impact because of their size.
- (11) Mineral extraction and timber harvesting that are generally considered to be unattractive activities that should be screened from public view. (See Policies 37 and 41.)[A-f3]

The Need for Design Evaluation. The Coastal Zone Conservation Act of 1972 states that one objective of the Coastal Plan is "the maintenance, restoration, and enhancement of the overall quality of the coastal zone environment, including, but not limited to its amenities and aesthetic values" (Public Resources Code Section 27302(a)). In order to achieve this objective, it would be ideal if highly specific design criteria could be established for all new development along the coast. But because of the great variety in the existing character of the coastline, because of the dynamic changes taking place in social values and building technology, and because different people have different concepts of "beauty", necessitating intensive involvement of community residents in determining the desired visual qualities that should exist in the hundreds of communities along the coast, highly specific criteria cannot be established for the entire coast at this time. Until design plans, specific criteria, and enforcing regulations can be formulated by coastal communities and the coastal agency, the application of general design guidelines, refined to as much specificity as possible by regional and local amplification, through a design review process, appears to be the best method for guiding development to preserve or restore the attractive appearance of the coast. [A-f4] (For findings and policies relating to restoration of visually degraded areas, see Restoration of Coastal Resources chapter.)

Protecting Coastal Visual Resources

POLICIES

47. Evaluate Development to Protect Coastal Viewshed. The entire California "coastal viewshed" shall be considered a public resource. Within this area the designs for all development proposals shall be evaluated so that the viewshed quality can be preserved where existing natural or manmade areas are scenic,

enhanced by the addition of attractive improvements, and restored by the removal of undesirable visual elements. (See Restoration of Coastal Resources chapter for restoration policies.) The viewshed shall be defined to include all land and water areas that can be seen from the sea, from the water's edge, from principal coastal access roads, trails, and railroads, from major lateral transportation corridors leading to the coast, as well as other areas specified by the coastal agency as being of statewide importance based on subsequent viewshed studies. [A-p1]

Regional Amplification

South Central: In the South Central Region the coastal viewshed would include the large expanses of undeveloped land immediately adjacent to the coast through which no present public access exists. In these cases the coastal viewshed shall be from the coast to the crest of the nearest mountain ridge. [A-p1RA]

48. Development to Be Compatible with Highly Scenic Areas. New development shall be compatible with scenic areas and shall not be permitted to degrade natural, historical, or open areas of high scenic value. Programs to protect these areas shall include development controls that require all future development to be visually compatible with the existing scenic values, public acquisition of some areas, and other techniques recommended in Part III, Carrying Out the Coastal Plan. Natural, historical, or open areas of high scenic value shall include (1) landscape preservation projects designated by the State Department of Parks and Recreation in the California Coastline Preservation and Recreation Plan [A-p2a]; (2) historical sites identified by the State Department of Parks and Recreation in the California History Plan and the second-phase Inventory of Cultural Resources [A-2pb]; (3) open areas identified and mapped in the Coastal Plan as being of particular value in providing visual relief from urbanization, in preserving natural landforms and significant vegetation, in providing attractive transitions between natural and urbanized areas, in carrying out the

policies of the Coastal Plan, or as scenic open space. (Additional areas may be designated in the final Coastal Plan.) [A-p2c]

Regional Amplification

Central Coast: Additional areas of high scenic value include areas of fragile open space values identified in local and regional plans, and in the Intensity of Development Element, as important visual transition areas, urban, industrial, or agricultural buffer zones, particularly: Pacifica hillsides and ridges, Montara Mountain, midcoast agricultural lands, Santa Cruz Mountains, Rancho San Andreas agricultural lands, Santa Lucia Mountains, Moss Landing wetlands and agricultural lands, and the Monterey Bay dunes. Scenic areas also include critical ocean view areas, including the entire area seaward of the public road nearest the coast where offshore rocks or surf are visible from the traveled way or turnout; and generally all lands lying between the Highway and the ocean where the average right-of-way to mean high water is 100 yards or less. Also included are 11 scenic routes in the Region and areas of outstanding scenic quality identified by the Highway 1 Viewshed Study (in progress), and outstanding landmarks, natural areas, historic areas, and prominent landforms not publicly owned specifically for scenic preservation, as identified in the Plan Maps in Part IV. [A-p2RA]

49. Require Localities to Have Design Elements. The Legislature should require and fund cities and counties along the coast to develop and implement Design Elements in their general plans. These Elements shall be required to include: appropriate guidelines, criteria, and standards that are consistent with the appearance and design policies of the Coastal Plan; a sign ordinance to apply the standards set forth in Policy 58; and definitive design criteria for improving the appearance of the shoreline based on detailed studies of urban waterfronts carried out by local municipalities. [A-p4 and A-p28a] Areawide design guidelines should be formulated as part of Design Elements so that development proposals can be coordinated in order to maximize open space preservation; to protect view corridors, natural vegetation, landforms, and other features; to effectively link open space systems with paths and bikeways; to reduce the need for duplicating circulation systems; and to minimize the appearance of visually intrusive structures. [A-p29b] Transportation, land use, utility, and recreational planning should be coordinated with Design Elements. [A-p29a]

50. Establish a Design Review Process. Until coastal cities and counties have prepared and implemented Design Elements that carry out the Coastal Plan policies to the satisfaction of the coastal agency, all public and private development within the coastal viewshed shall be subject to design review.

[A-p4] This review shall ensure that development is consistent with the design guidelines contained in Policies 53 to 61 and with the special policies for each individual Region. [A-p5]

a. Consider Cumulative Design Impact. The coastal agency shall consider the cumulative design impact of proposed development in evaluating permit applications while the city and county Design Elements are being prepared.

[A-p29a]

b. Require Coordinated Design Plans. Where development is proceeding rapidly in small neighborhood areas or on adjoining or nearby properties in undeveloped areas, the area shall be considered as a single unit, and the developers shall be required to jointly prepare an overall design plan to coordinate open space, internal circulation, design themes, view protection, and other visual elements and to meet the requirements of the design guidelines and other Coastal Plan policies. [A-p29c]

c. Developer to Prepare Area Plan for Intense Development. Large-scale new development in rural areas and urban development that would be of a substantially greater density than the surrounding area shall be in accordance with an area plan, prepared at the developer's expense, that specifies the general location of uses by height, bulk, and density, and that indicates the location or methods for preserving open space, ocean breezes, views, and public access. The impact of any proposed major structures on views, shadows, glare, and wind patterns shall be evaluated as part of the area planning. [A-p6]

d. Large, Intensive Subdivisions and Developments Must Have Detailed Design Plans. Subdivision and development of waterfront area properties larger

than 3 acres, or development proposals of more than 15 dwelling units per acre in suburban areas (20 per acre in urban areas), shall not be permitted unless consistent with a detailed design plan, prepared at the developer's expense, that demonstrates that the development will comply with the appearance and design guidelines and policies of the Coastal Plan. [A-p27b]

- e. Design Review Process. To evaluate visual aspects of development proposals and to advise the coastal agency on both design issues and the application of other Coastal Plan policies through design techniques, (1) a design professional shall be on the staff of the agency; (2) design review boards should be established in coastal municipalities; and (3) regional design review boards shall be established by the coastal agency to evaluate development proposals that are of regional significance or that are in areas not served by local design review boards. Design review boards shall consist of coastal zone residents who have displayed an understanding and appreciation of the history, aesthetics, and goals of coastal communities, and design professionals (e.g., architects, landscape architects, urban designers, planners, engineers, artists, sculptors, etc.). [A-p4]

Regional Amplifications

Central Coast: A regional design advisory committee (RDAC) shall be established, composed of at least two independent design professionals, one coastal agency staff member, one regional government staff member, one resident of the coastal subarea of each county in the region, and one member of the public from outside the coastal zone. [A-p4RA]

South Coast: Until a precise and comprehensive skyline study is undertaken to plan and determine the location of nodes of coastal development, the Design Review Board may require photo-montages, models or other devices to aid in the consideration of proposed medium or high rise buildings. Consideration shall include the impact of high rise buildings on views, shadow, glare, traffic and parking, wind patterns, and microclimates. Other appearance and design qualities shall be clearly understood prior to decision-making concerning their construction. [A-p4RA]

Within the boundaries of any community, coordinated design of the elements of the public areas such as street furniture, street lighting, store fronts, landscaping, beach concession stands, restrooms, life guard posts, etc., shall be created, subject to local Design Review Board approval.

51. Establish Design Awards and Competitions. The coastal agency shall encourage excellence in the design of public and private structures and, in cooperation with organizations of the design profession and design schools, shall (1) present design awards to development that effectively relates to its coastal location through a sensitive use of form, color, material, texture, and layout, and to community beautification projects that restore and enhance the visual assets of the coast, and (2) initiate design competitions for such items as street furniture, retaining walls, beach stairs, and prototypical structures, and distribute the winning designs to coastal communities for use in building projects. [A-p31]

52. Reduce Litter in Coastal Areas. All public recreational areas, scenic road turnouts, and other such areas shall contain adequate, well-designed litter containers. Maintenance (emptying) of these containers, raking of beaches, and anti-litter patrols along highways and in wilderness areas should receive high priority in state budgeting and local cleanup campaigns. [A-p5RA] To greatly reduce litter along the coastal roads, in waterfront recreational areas, and in shoreline communities, the State Legislature should enact laws to prohibit the sale in California of non-returnable glass bottles, aluminum and metal pop-top cans, and non-biodegradable plastic packaging, if current studies by the Legislative Analyst conclude such legislation would be economically feasible and effective. [A-p32]

Design Guidelines for the Coastal Zone

DESIGN GUIDELINES IN OPEN SPACE AND LANDFORM AREAS

POLICY

53. Integrate Development with Natural Environment. The scenic value of natural landforms shall be preserved, enhanced, and restored. Development shall be integrated with and visually subordinate to existing natural features and terrain. Structures shall be located to minimize their intrusion into scenic open spaces by being clustered near other existing natural and manmade vertical features (such as tree masses, hills, rock outcrops, and existing structures). To ensure that structures are integrated into the natural environment, the following guidelines for development on specific landforms shall apply except where it would make an existing parcel unusable and where public acquisition of such a parcel is not appropriate (see Policy 65).

[from A-p6a and A-pl7-25]

- a. Design Guideline: Beaches. No structures shall be permitted on the open beach itself except facilities necessary for public health and safety (e.g., beach erosion control structures and life guard towers) or structures found to be necessary for public welfare. All other structures or other improvements shall be located inland from the open beach. [A-p17]
- b. Design Guideline: Sand Dunes. The scenic and natural values of sand dunes shall be protected, enhanced, and restored. No development shall be allowed that would hamper natural dune movement. [A-p18d] New developments shall contain provisions to preserve, restore, and protect at least as much dune area as is used for development. [A-p18c] Where development currently exists or dunes are in a degraded state, high priority shall be given to restoration projects. [A-p18b] Structures within dune areas

that would intrude above the ridgeline of dunes, or damage dune-stabilizing vegetation, shall not be permitted. [A-p18a] Pedestrian and vehicular traffic in fragile sand dune areas shall be minimized. [A-p18e]

- c. Design Guideline: Coastal Bluffs. Development on bluffs shall be controlled to minimize their degradation. No structures shall be permitted to be built on a bluff face except for access stairways (which shall be for public use, minimized in number, and conveniently located) and erosion control structures, such as seawalls, in accordance with Policy 18. [A-p19a] Approved structures shall be constructed of materials that reproduce natural colors and textures as closely as possible. [A-p19c] Drainpipes shall be minimized by collecting runoff and directing it landward, where possible, and shall be unobtrusive in appearance. [A-p19d] No dumping shall be permitted over coastal bluffs except where necessary for erosion control measures specifically authorized by the coastal agency and consistent with other Coastal Plan policies. [A-p19e] Blufftop development shall be set back from the bluff edge sufficiently far to ensure that the development cannot be seen from the shoreline (mean high water) except in highly urbanized areas where adjoining development is nearer the bluff edge, or in special cases where a facility that would be used by substantial segments of the public has been justified in an approved urban design plan for the area. [A-p19b] (See also Policy 177 regarding development in bluff hazard areas.)
- d. Design Guideline: Wetlands and Estuaries. The visual appearance of estuaries and their surrounding beaches and wetlands shall remain intact. [A-p21a] Public access provisions shall be designed to respect the visual and ecological fragility of estuaries and their adjacent land areas. [A-p21b] Coastal roads shall be located on the inland side of the estuaries. [A-p21c] (See also Marine Environment section on Coastal Waters, Estuaries, and Wetlands.)

- e. Design Guideline: Islands. Development on islands, except for light-houses and ancillary facilities necessary for public safety, shall blend with the natural visual form of islands and shall not extend above the natural silhouette of the island. [A-p22]
- f. Design Guideline: Headlands, Hillsides, and Canyons. Private roads on headlands shall be visually screened, and driveways connecting to the coastal highway minimized. [A-p20b] The transitions between headlands and related stream canyons shall be left in a natural state with bridges over canyons located as far inland as physically feasible and environmentally acceptable. [A-p20c] Grading, cutting, and filling in canyons and arroyos and on hillsides shall be in accordance with Policy 57. [A-p24a] and bridges and roads across canyons shall be minimized, combined, and located at the narrowest crossing points. [A-p24b] Development on canyon edges and hilltops shall not be visible from the canyon or valley floors. [A-p24c] Coastal canyons with recreational and natural study value shall not be used for sanitary landfill where alternatives are available. [L-pl]
- g. Design Guideline: Upland Terraces and Plains. Structures shall not be located in open grassland areas where they would be highly visible [A-p23a] and development on upland hilltops and ridges shall not be visible from the terraces or plains below. [A-p23c]
- h. Design Guideline: Rivers and Streams. Development shall be set back from the edge of rivers, streams, and other natural waterways to protect riparian vegetation, minimize erosion, and preserve the visual contours of the waterway. [A-p25a] Channelization projects, where specifically authorized and consistent with other Coastal Plan policies, shall include landscaping, public trails, and linear parks to mitigate the visual damage resulting from the channelization and to maintain, enhance, or restore recreational opportunities. [A-p25b]

Regional Amplifications

BEACHES

South Coast: No construction (with the exception of movable lifeguard stations, public piers, beach erosion control devices, and other facilities necessary to public health and safety) shall be permitted on any sand beach within 200 feet landward of the mean high tide line, when the sand areas exceeds 200 feet deep. When the sand area is less than 200 feet deep, permanent structures shall be limited to those which are necessary to public health, safety, and convenience, and shall be erected as far inland from the mean high tide line as is feasible. [A-p17RA]

COASTAL BLUFFS

Central Coast: Any structure below bluffs shall be limited to a maximum 20 per cent of bluff height. [A-p19RA]

South Central: Houses built in existing subdivisions will be required to provide views of the blue water from the street. This may be achieved by side setbacks, by not planting tall tree species, and not building fences over four feet high. Stairways over bluffs: Only wooden stairways may be constructed without a full engineering study. No stairway may be built over a bluff more than 25 feet tall without engineering and geological justification that it will be safe and not increase erosion. No stairway may be built over the face of a bluff over 25 feet tall without allowing public access over from the beach to the nearest public way. Any stairway to be built on a bluff must be approved on the basis of aesthetics—that its particular design not overwhelm the face of the bluff and that it does not come so close to another stairway that it adds clutter to the environment. A proliferation of stairways should be avoided with one stairway being used by many owners. No bluff may be cut, faced, paved, or walled to allow a stairway to be built except for necessary footings. [new RA]

The visual impact of any permitted bluff protection structure shall be minimized in the following ways: (1) no structure may be more than eight feet in height without proof from a qualified engineer or geologist that a larger structure is needed; (2) walls shall not be of rubble, sandbags, or unfinished concrete; (3) walls shall be of natural materials, or of colors and texture that are consistent with the colors found in the rocks and sand at the site; (4) no retaining wall or seawall shall extend more than 100 feet in length without a change in direction and/or wall texture; and (5) any wall over eight feet tall or 100 feet in length shall be approved by a qualified landscape architect. [new RA]

South Coast: No development, except that of access, public safety or of a recreational nature, as safety permits, shall be permitted within 25 feet of the rim of a cliff or bluff, or 50 feet from the toe of the cliff or bluff. [A-p19RA]

San Diego: No building or major structure shall be placed or erected closer than 25 feet from any point of the top edge of the bluff except landscaping, improvements required by the Commission as part of the public access, minor developments such as fences, decks, patios, stairways.

[A-p19RA] New structures shall be so located as to preclude the necessity of constructing protective seawalls or retaining walls. [A-p6RA] Those coastal bluff areas that are already substantially committed to terraced homes down the face of the bluff such as Pacific Street between Wisconsin and the Buena Vista Lagoon in Oceanside and Ocean Street in Carlsbad are exempt from the 25-foot setback requirement.

To provide for vista corridors and on-site recreational opportunities, generally for larger projects, 50 per cent of the net usable portions of the project site should be landscaped open space. Landscaped open space is defined as those contiguous ground areas covered by natural vegetation. The net usable portion of the site does not include land lying seaward of the top edge of the bluff, portions of the site subject to an easement for street or highway use, or adjacent street ends even though they are improved to qualify as part of the applicant's vista corridor.

Every developer of a major bluff top development (e.g., those developments of more than two dwelling units and sited on land parcels with more than 50 feet of ocean frontage) should design and maintain a vista corridor through his development. One formula which would provide for the suggested vista corridor would be as follows: Vista Corridor = .33 lot width + .05 (lot depth - 100') where depth 100'. (100' = per cent of lot width to be added to the 33 per cent constant for vista corridor calculation. The maximum vista corridor required is 50 per cent and the minimum is 33 per cent.

The height of the structures on the project site should be dependent on the width of the adjacent vista corridor and should not exceed the width of the adjacent vista corridor or thirty-five feet whichever is the lesser. A maximum of three levels above the natural or existing grade shall be permitted. Height shall be determined from the natural or existing grade prior to any cutting or filling on the site. On project sites of 50 feet or less in width, developments may have a maximum height not to exceed two stories providing such structures are architecturally proportional to the site.

Property abutting a street end that meets the top edge of the coastal bluff may include one half the width of the street end as part of the vista corridor so long as the applicant improves and maintains the street end in accordance with the directions of the Commission.

Only those portions of the project site that are free of visual obstructions shall be counted as part of the vista corridor. Any object exceeding two feet in height above finished grade is an obstruction except: (1) fences with an open area to obstructed area ratio of 6:1, (2) trees which at maturity will not obstruct vision from finished grade to approximately eight feet above finished grade. [A-p19RA]

WETLANDS AND ESTUARIES

San Diego: Uses of the uplands surrounding wetlands shall be permitted only if they are designed so as to protect the aesthetic integrity of the wetlands and their visible surrounding. [M-p9RA]

HEADLANDS, HILLSIDES, AND CANYONS

South Coast: Appearance and form of coastal zone hillsides in the Region shall be treated as an amenity resource. Design consideration shall include views of hillsides as well as public access to views from hillsides. All permits for grading on hillsides in the permit area shall include the requirement that all possible land shall be restored to its natural form, and that the transition zone between natural and disturbed areas shall be designed to blend with the natural form. Ground cover and other appropriate landscaping shall be restored on the land disturbed by grading. In areas S1 and S2 development of hillsides of 35 per cent slope or greater steepness shall not be permitted. Development of hillsides of between 15 per cent and 35 per cent slope shall only be permitted very low density (maximum 1 dwelling unit per 4 acres, gross density). Such development will be subject to review for overall preservation of the natural open and rural character of the entire hillside. Variances to these standards may be granted if it can be established that the hillside can be developed in a manner that will result in less visual disruption than would occur under the standard criteria. [A-p24RA]

UPLAND TERRACES AND PLAINS

North Coast: No new structures should be permitted on the shelf when it can be seen from bridges that afford views of the ocean, river mouths and shelves. [A-p5RA]

DEVELOPMENT AND COASTAL VIEWS

POLICY

54. Prevent Development from Blocking Coastal Views. Development (including buildings, fences, paved areas, signs, and landscaping) shall not be allowed to significantly block views of the coast from the coastal road, inland parks, and other public areas, or diminish the visual quality of the coast by intruding into scenic areas. [A-p11] In addition:

- a. Views from Key Public Viewing Points. New development shall not be permitted to block scenic views of the coastline and shoreline areas from key public viewing points such as roads that terminate at the coast, roadside turnoffs, recreation areas, and beaches. [A-p11a]
- b. Views of Natural Features from Roads. In all major new development, views of attractive natural features (such as dunes, the surf, coastal bluffs,

outcroppings, and estuaries) from the nearest public road shall be protected and public vista areas shall be provided. [A-p11d]

- c. Limit Structures in Shoreline Area. Tall structures that would destroy the existing scenic quality of low-rise urban areas as seen from inland viewing points or block views of the coast shall not be permitted along the immediate shoreline. [A-p11b]
- d. Limit Seaward Extent of Oceanfront Development. In developed areas, so that existing views are not blocked, new oceanfront development shall not extend farther seaward than the adjacent structures unless (1) this would make an existing parcel unusable and where public acquisition of such a parcel is not appropriate (see Policy 65), and (2) such development is in accordance with other policies of the Coastal Plan. [A-p11c]

Regional Amplifications

Central Coast: Additional public access to scenic views shall be considered a public benefit when included in projects under review (provided that environmental degradation does not result from access). [A-p29RA]

South Coast: No new structure shall substantially increase the distance between views of the ocean and shoreline nor eliminate such views where they currently exist. Tall buildings may be required to provide public access to an appropriate vantage point in an upper level, roof, plaza, or suite for viewing, or be required to maintain ground level view access beside or through their ground level structures. The appropriate view access shall be determined by the coastal agency. [A-p11RA]

San Diego: Development shall not be allowed to infringe unnecessarily on those views which are considered by the San Diego Coast Regional Commission or any implementing agency to be of regional significance, or those high quality views identified on CPO's Coastal Vistas map. In most areas, multistory development shall be located back away from the ocean front far enough to maintain the existing scale and open feeling characteristic of the coast. [A-p11RA]

GENERAL DESIGN STANDARDS

POLICIES

55. Design Guideline: Scale, Height, Materials, and Colors. All new development shall either be compatible with the character of the surrounding attractive area or shall enhance the quality of areas that have been degraded by existing development. [A-p6] Materials and colors used in building construction should be selected on the basis of their compatibility both with the structural system of the building and with the appearance of the building's natural and manmade surroundings, rather than to use pre-set architectural styles (e.g., pseudo-Spanish mission and standard fast-food restaurant designs). [A-p6c]

Regional Amplifications

North Coast: If higher intensities are desired, plans should show an increase in the amount of open space currently found in existing developments. If larger scale developments are desired, adequate buffers between the new developments and existing developments must be provided. In urban areas, new developments should be in keeping with existing skylines. Different building heights are desirable when they break monotony and do not block views. [A-p6RA]

Central Coast: When private housing and other uses are permitted in rural areas, the major design determinant is the open space resource; landforms, vegetative masses, and available public views should strictly determine the location, scale, bulk, and height of the structures. [A-p6RA]

56. Design Guideline: Landscaping. Plant materials shall be used to integrate the manmade and natural environments, to screen or soften the visual impact of new developments, and to provide diversity in developed areas. In new development, existing attractive vegetation shall be protected and plants common to the particular coastal region shall be used as the predominant additional landscaping material to reduce the need for irrigation systems and extensive maintenance programs. [A-p10]

Regional Amplification

San Diego: Groundcover planting shall be required when and where erosion control is necessary to stabilize soils. [A-p10RA]

SPECIAL DESIGN GUIDELINES

POLICIES

57. Minimize Alteration of Natural Landforms. The visual destruction of natural landforms caused by cutting, filling, grading, or vegetation removal shall be minimized. [A-p9] Specifically:

- a. No Significant Alteration Allowed. Development or its support facilities (such as road and utility expansions) shall not be permitted if they would require grading, cutting, or filling that would significantly alter the appearance of natural landforms. [A-p9a]
- b. Restore Natural Contours. After any permitted temporary alteration of natural landforms during construction, timber harvesting, or mineral extraction, the topography shall be restored to as close to the natural contours as possible, and the area shall be planted with attractive vegetation common to the particular coastal region. [A-p9c]
- c. Minimize Alterations for Permitted Developments. In permitted development, landform alteration for building sites, access roads, and public utilities shall be minimized by (1) concentrating development on level areas so that hillsides can be left undisturbed, (2) waiving minimum street width requirements and using one-way circulation systems so that necessary hillside roads can be as narrow as possible, and (3) running hillside roads along natural topographic contours. [A-p9b]

58. Restrict Visual Degradation from Signs. Signs and billboards shall not be allowed to block coastal views, cause visual clutter that conflicts with the ordered design of coastal communities, or detract from the natural beauty of the coast. Cities and counties, as part of their Design Elements, should be mandated to develop sign ordinances for the purpose of applying the following standards. Until these ordinances have been enacted, the standards shall be

applied by the coastal agency to specific coastal areas that can be seen from principal coastal access roads, trails, railroads, and major lateral transportation corridors leading to the coast. [A-p8]

- a. Ban Off-Premise Commercial Signs. New off-premise commercial signs (those that do not advertise (1) a use being made of the premises, (2) the name of the owner or use, or (3) a product, service, or entertainment available on the premise) shall not be permitted. [A-p8a] After the periods of time specified in the following amortization schedule, existing off-premise signs shall be removed. [A-p8b]

<u>Permit value of sign</u>	<u>Period for removal</u>
\$10 or less	immediately
\$10.01 to \$100	1 year
\$100.01 to \$500	2 years
\$500.01 to \$750	3 years
\$750.01 to \$1,000	4 years
\$1,000.01 to \$2,500	5 years
\$2,500.01 to \$5,000	6 years
over \$5,000	8 years

[source of schedule, City of Palm Springs sign ordinance, 1967]

- b. Alternatives to Commercial Signs and Billboards. In place of off-premise commercial signs, coastal communities should provide alternative means for informing the public about commercial services and products available in the communities. These alternatives could include low-power radio broadcasts or local radio station programs and spots designed for travelers, and kiosks or other well-designed, integrated displays at roadside turnouts near major community entrances. The California Department of Transportation should cooperate in designing and erecting attractive signs to alert travelers about these informational displays and in providing roadside turnouts. [A-p8c]
- c. Design of On-Premise Commercial Signs. On-premise commercial signs, for identification and information purposes only, shall be designed as an integral part of the structure they are identifying, shall complement

or enhance the appearance of the surrounding area, and shall not block coastal views. [A-p8d]

- d. Types of Prohibited On-Premise Signs. The following kinds of signs are specifically prohibited except where the coastal agency finds either that this prohibition would result in a greater negative impact than would allowing one of these types of signs (e.g., where prohibiting a roof sign would necessitate cutting down trees to make a wall sign visible), or that the sign represents a creative, artistic, and effective design solution consistent with other Coastal Plan policies and design guidelines:
- (1) signs that are located on or project over the roof of a building or structure; (2) fabric signs and banners; (3) flags, other than those of any nation, state, or political subdivision; (4) pennants, streamers, bunting, and wind signs; (5) "A" frame and portable signs of any nature; (6) statues used for advertising purposes; (7) the outlining of a building by means of exposed neon tubing, exposed incandescent lighting, or other artificial lighting; [A-p8d] and (8) commercial signs that rotate, change, reflect, blink, flash, or give the appearance of performing any of these actions. [A-p8e]
- e. Design Few, Simple, Harmonizing Information and Direction Signs. Public information and direction signs shall be of a simple, easy-to-read design, shall make use of materials and colors that harmonize with surrounding elements, and shall be as few in number as possible. [A-p8f]

Regional Amplification

South Coast: Signs that have been abandoned or have fallen into disrepair shall be removed or brought into conformance with acceptable standards, respectively. Signs shall not obscure or detract from building silhouettes and architectural detail. Sign height should be within the normal cone of vision (not to exceed in height $\frac{1}{4}$ the distance from the viewer as seen at a horizontal angle of 30° from the center of the right-of-way). No private signs shall be allowed to block, partially block or be in visual conflict with public regulatory, directional, identification,

scenic route or other instructive signs. All local and State agencies responsible for location, maintenance and design of public signs shall coordinate their efforts and plans in the future management of public signs in order to minimize conflict, redundancy, and unnecessary visual clutter. [A-p9RA]

59. Minimize Visual Impact of Utility Structures. The visual degradation of the coastal landscape caused by power and communication lines and towers shall be minimized: [A-p12]

- a. Avoid Duplication of Facilities. Utility distribution and transmission facilities shall be designed as a coordinated system to avoid unnecessary duplication. [A-p12a]
- b. Place Facilities Underground. Distribution facilities and service connections shall be placed underground except where undergrounding would be inconsistent with sound environmental planning. [A-p12b] Transmission facilities (i.e., powerline of more than 40 KV) within the scenic areas identified in the Coastal Plan shall be undergrounded in accordance with a program developed jointly by the coastal agency and the State Public Utilities Commission. [A-p12c]
- c. Design of Above Ground Facilities. Except where inconsistent with sound environmental planning, new above ground transmission facilities shall (1) follow the least visible route (e.g., canyons, tree rows, and ravines), (2) not be visible above ridgelines, (3) follow, not compete with, either natural features of the terrain or manmade features in developed areas, and (4) be well designed, simple and unobtrusive in appearance, have a minimum of bulk, use the minimum number of elements permitted by good engineering practice, and make use of colors and materials compatible with local surroundings. [A-p12d]
- d. Determination of Feasibility. Feasibility of the foregoing shall in each case be determined by the coastal agency based on analysis of environmental, economic, and technological information. [A-p12]

Regional Amplifications

Central Coast: Utility lines should be severely restricted in scenic highway corridors. Undergrounding of existing overhead facilities shall be a high priority in all developed or developing areas, and shall follow all land divisions unless proved infeasible. [A-pl2RA]

San Diego: Coastal communities shall give priority to the undergrounding of aerial facilities in scenic coastal areas. [A-pl2RA]

60. Screen Public Service Facilities from View. Major public service facilities, such as power plants, sewage treatment facilities, solid waste disposal facilities, water storage tanks, pumping stations, power and communications substations and other such facilities, shall not be located along the immediate shoreline unless there is no less environmentally damaging alternative. Wherever located, they shall either be screened from public view (by use of natural terrain and vegetation or buffer areas and artificial screening) or be designed in a manner that is subordinate to natural landforms or compatible with the surroundings (e.g., by use of harmonizing colors, textures, and massing or by undergrounding). [A-pl3]

Regional Amplification

North Coast: Solid waste disposal sites (sanitary landfills) should not be permitted in the planning area when within public view or when the disposal site might degrade the esthetic or environmental quality of this area. [A-pl3RA]

61. Design Industrial and Commercial Structures for Lessened Visual Impact but Greater Access. Facilities such as manufacturing plants and shopping centers shall, except as provided below: (1) be of a height, bulk, and color that blends well with that of surrounding structures, (2) provide physical and visual access to the coast for workers, visitors, and the general public, (3) not have significant adverse impacts on the visual quality of clean air and water, and (4) not generate excessive noise or unsightly congestion. Where safety, noise, or other functional considerations make it impossible to integrate industrial facilities into the community structure, adequate open

space for buffers, berms, and landscaping shall be provided between industries and other uses so the facilities can be screened from public view. [A-p15]

Regional Amplification

South Coast: In order to restore openness to areas now congested, crowded, and/or blighted in areas U1, U2, U3 and S3, open land shall be used to buffer conflicting uses such as heavy industrial and residential use. In areas where conflicting uses are not buffered, long-range acquisition plans will include land clearance projects to create the necessary buffer zones. [A-p7RA]

Public Access to the Coast

FINDINGS

Constitutionally Guaranteed Public Access Is Being Lost. Of the 1,072 miles of California coastline, only 408 miles are in public ownership, and 156 miles of the publicly owned shoreline are along military lands generally not available for public recreation. However, the right of public access to all coastal tidelands is guaranteed by the California Constitution and has been expanded in scope by various statutes and court decisions. In addition to the publicly-owned coastal recreational facilities, much of the coastline has historically been used by the public for recreation. In recognition of similar public use, Texas and Oregon have enacted "Open Beaches" laws to guarantee public access to larger parts of their coastlines; similar legislation has been considered by the U.S. Congress. Despite legal guarantees and historical public use of the California coastline, much access to the shoreline has been lost by the erection of fences, buildings, and other structures. [R-f9]

Ways to Provide for Public Access. Public use of the coastline can be provided both by strengthening the public's existing legal rights and by expanding the area along the coast in public ownership. State legislation could be enacted that would protect the public's right to use coastal dry sand and rocky beaches and those coastal bluffs and headlands customarily used by the public. Existing powers that enable regulatory agencies to require either public access as a condition in the approval of subdivisions or developments, or where public access is not feasible or desirable, the payment of "in lieu" fees for the acquisition of access elsewhere could be more fully utilized. The Subdivision Map Act could also be amended to make such requirements mandatory. Experience indicates that access can be required without undue hardship to private property owners. A State agency could be charged with the explicit responsibility for enforcing the public's right to have access to and use of the coastline by bringing suit on behalf of the public. In addition, the power of eminent domain could be employed to acquire access to the coastline in areas where it cannot be secured through the regulatory process; the State Department of Parks and Recreation presently is not empowered to use eminent domain to acquire trails and beach access. [R-f8]

Public Ownership Can Expand Public Use of the Shoreline. Finally, public enjoyment of the coast could be maximized and the resources of the shoreline could be preserved and managed for the benefit of all Californians if more of the shoreline area were owned or controlled by public agencies. Such ownership could include recreational areas, ecological reserves, and military and institutional uses that provide resource protection and public use. [new]

Institutional Facilities Provide Public Access Opportunities. Because their peak use times do not generally coincide with peak coastal recreational use, and because of their public service orientation, certain institutional facilities such as libraries, city halls, and colleges, if properly planned, can provide substantial opportunities for greater public access and enjoyment of the shoreline, and can complement the protection, enhancement, and restoration of coastal resources. [I-f8]

Military Lands Have Potential for Providing Public Access. Military bases located on the coast have often served to protect coastal resources. However, many such bases also have the potential of providing additional significant opportunities for public coastal access that would be consistent with both military uses and resource protection. [I-f9]

Private Development in the Coastal Area Can Impede Coastal Access. Along the immediate shoreline, homes, businesses, and industries have often cut off existing public access to the coastline, have used up available road capacity and off-street parking, and have precluded use of the coastline area for recreation. [R-f5b] Development back from the shoreline also affects the ability of residents and tourists to get to and to use the coast. In addition to its impact on transportation systems serving the coast, development can reduce upland recreational opportunities that would otherwise relieve demand on the shoreline. [New] Commercial recreation, on the other hand, is a private use of the land that can provide benefits for the general public when public ownership is not possible. (See also the Recreation chapter.) [New]

High-Cost Housing and Tourist Facilities are Restricting Coastal Access. Because of rising land and construction costs, and high property taxes, the limited amount of land available on the coast, and the demand for higher-priced housing and visitor accommodations, few housing and tourist facilities for persons of low and moderate income are now being built in the coastal zone. Moreover, existing housing and tourist facilities serving low- and moderate-income persons are being replaced by higher cost apartments, condominiums, and motels. This trend, begun several years prior to the passage of the Coastal Act, is in several coastal areas changing the character of the population near the coast. Many elderly and low-income people, for example, can no longer afford coastal living and are forced to live elsewhere. [I-f13]

Condominium Conversions Displace Low- and Moderate-Income Persons. The process of converting rental units to condominiums often causes the elderly, and other moderate- and lower-income persons and families to move out of the coastal zone due to difficulties in obtaining mortgage financing, their lack of savings to cover the down payment requirements and their inability to afford monthly payments higher than apartment rents, and the reduction in the amount of rental housing caused by the cumulative effect of condominium conversions elsewhere in the coastal zone. [I-f14]

Expensive Recreational Facilities Can Exclude Equal Access. Some areas of the coastline have been used for recreational activities involving expensive items such as second homes, large boats, and exclusive clubs that are limited to a relatively small portion of the general public. Unless these and other such costly recreational resources are made available to the general public through rental programs, many people will be precluded from enjoying certain areas. [R-f5]

The Physically Handicapped Should Also Have Access to the Coast. Many recreational areas and facilities can be made more accessible to the physically handicapped through better design. Natural and scenic trails that accommodate the needs of the handicapped have been developed by various governmental agencies. [R-f16]

The Right of Public Access

POLICIES

62. Guarantee Traditional Public Use of the Coastline. The rights of public use of the coastline as mandated by the State Constitution and the courts of California shall be effectively guaranteed. To this end: [R-p7]

- a. Prevent Development from Encroaching on Public Use Areas. Development shall not be permitted to interfere with the traditional public use of the tidelands, dry sand and rocky beaches, and those coastal bluffs and headlands historically used by the public. [R-p6a]
- b. Broaden the Public's Legal Rights. Legislation should be passed to: [R-p7]
 - (1) Preserve and maintain, consistent with the U.S. Constitution, the public's right, acquired through historic use and custom, to use dry sand and rocky coastal beaches to the first line of terrestrial vegetation, and those coastal bluffs and headlands customarily used by the public. [R-p7a]
 - (2) Recognize that, in judicial proceedings, showing that an area is a coastal beach should establish a presumption that the public has traditionally used the area up to the line of terrestrial vegetation for recreational purposes, unless the affected landowners can show that such historical use could not reasonably have taken place for the public to secure any legal rights to continue using the beach. [R-p7b]
- c. Enforce the Public's Rights. The Legislature should direct the Attorney General's Office or the coastal agency to more actively enforce the public's existing rights under the implied dedication decisions to have access to and use of the coastline and to take all necessary steps to protect the public's rights including bringing suit on behalf of the public. [R-p7g]

- d. Restrict Signs that Discourage Access. No signs shall be posted that would discourage the public from exercising its legally guaranteed rights of access to the coastline. [from R-p6RA]

Regional Amplification

San Diego: The coastal agency shall establish a repository of all information gathered by local jurisdictions, private groups, and citizens regarding the establishment of prescriptive rights through implied dedication and the extent of public trust rights. Local jurisdictions and State and Federal agencies shall not be permitted to unreasonably restrict public access to beach areas by preventing the development of access facilities designed to serve the general public. [R-p6RA]

63. Provide Public Access to the Coastline. Public access from the nearest public thoroughfare to the coastline shall be provided in and where appropriate separated from new developments. [R-p6e] Specifically:

- a. Require Access Through New Developments. New developments shall provide public access by dedication of an easement or fee title to an access way to a public agency or by the recording of a deed restriction guaranteeing access across the property. However, where the coastal agency determines that public access is inappropriate such as where (1) adequate access exists nearby, (2) the topography makes access dangerous, (3) the proposed development is too small to include an access way, (4) the coastal resources are too fragile to accommodate general public use, or (5) public safety or military security precludes public use, the developer shall pay "in lieu" fees (to be established as the cost of obtaining reasonable access at fair market value across the property) to a fund for the acquisition of public access at a suitable location elsewhere. To the maximum extent feasible, in lieu fees shall be spent in the region in which they are collected. [R-p6e]

- b. Provide Blufftop Paths and Linear Parks. A coordinated system of paths and linear parks shall be provided on coastal bluffs, where consistent

with other plan policies, linking these areas with community trail and park systems, such as the Coastal Trails System recommended in Policy 91. [A-p19f]

- c. Expand Enabling Legislation for Requiring Dedications. New legislation should be passed to: (1) Amend the Subdivision Map Act (Government Code 66410 et seq.) to provide for review and approval by the coastal agency of local determinations that "reasonable public access is otherwise available within a reasonable distance from the subdivision." [R-p7c] (2) Extend the statute of limitations on government acceptance of coastal access dedications in the Subdivision Map Act or other appropriate statutes from the present three years to ten years. [R-p7d] (3) Continue the access dedication requirements of the Coastal Act (Public Resources Code Section 27403(a)) and make such requirements for access dedication a condition of local government permits for all coastal development. [R-p7e]
- d. Authorize State Agency to Acquire and Maintain Access Ways. A State agency (e.g., Department of General Services, State Lands Division, Department of Parks and Recreation, or the coastal agency) should be authorized to: (1) receive and adequately maintain and police public access ways and to hold liability for these areas; (2) require and receive the payment of a fee in lieu of the dedication of access if actual access is not appropriate; (3) exercise the power of eminent domain and expend the in lieu fees to acquire public access in areas where access cannot be secured through the regulatory process. [R-p7f]

Regional Amplifications

South Central: Public access to the top of bluffs should be provided in all new subdivisions, on all developments on sites greater than 5 acres, and wherever a site in an existing subdivision is heavily used. The access provided shall reflect the density of the community and the type of use expected, and the current use by the public of the site. The access shall take into account the erosion rate of the bluffs so that

it can continue for the life of the project. Where possible, access along the top of the bluff shall be provided. Maintenance and liability shall be assumed by an appropriate State agency. [New RA]

San Diego: Where appropriate, each applicant for a major bluff top development whose project site lies between the coastal bluff edge and the nearest existing public street shall dedicate, improve, and maintain a public easement from the nearest existing public street to and along the bluff edge for the full extent of the project site. When a project site abuts a street end, the access from the nearest public street to the bluff edge may be located on the street end as long as the applicant improves and maintains one half of that street end in accordance with the directions of the coastal agency. The public access shall be improved with an all-weather walkway, adjacent landscaping, protective railings, ground level lighting, trash receptacles, benches, and other improvements which may be deemed necessary. [A-p19RA]

Public Management and Use of the Shoreline

PUBLIC OWNERSHIP ON THE COAST

POLICIES

64. Public Ownership and Regulation of Coastal Strip. The long-term goal (possibly 50 years or more away) of all coastal zone planning and development should be public ownership of and access to a strip of land paralleling the coast. [I-p11] Specifically:

- a. Area of Strip Will Vary. The strip should contain those areas determined to have statewide and regional significance. The width of this strip should vary according to local conditions but should be large enough to permit significant opportunities for public use and enjoyment. In urban areas this might mean a strip several hundred feet to several hundred yards wide. Wherever appropriate, the strip should include all the area between the mean high tide line and the first public road. (See Policy 102.)
- b. Exceptions to Public Ownership Goal. Port facilities, occasional clusters of intense development (such as downtown areas), and those areas determined to be manmade resources in accordance with Policy 45

should be the only major exceptions to this goal. In those areas and in all other excepted areas, public access ways through or around the facilities connecting with other portions of the strip should be provided.

- c. Control Access. Access shall be controlled by the coastal agency to ensure that the level of use does not degrade fragile resources, public safety is considered, and trespass prevented. (See Policy 86 regarding control of access to protect resources.)
- d. Productive Uses Not Precluded. Public ownership should not preclude productive uses; for instance, the acquisition of scenic easements over coastal grazing lands to protect views would meet both recreational and agricultural needs.
- e. Minimize Development in Potential Area of Coastal Strip. Where new private development is permitted within the likely area of the strip, such development shall be minimized and shall be complementary to the long-term goal of public use and access. [I-p11]

65. Priorities for Public Acquisition. Highest priority for public acquisition of coastal areas should be given to open space along urban waterfronts where visual and pedestrian access to the coastline is limited and to presently subdivided small lots in scattered ownership if development on them would impede public access by using up remaining road capacity or would unavoidably despoil coastal views. [from I-p11, A-p28c, A-p30] High priority shall also be given to areas of high recreational value (identified in Policy 75), areas proposed for park and reserve status (identified in Policy 88), and areas of high scenic value (identified in Policy 48).

Regional Amplifications

Central Coast: Among the highest priority public use areas in the Central Coast Region are: (1) in Daly City, the area between the mean high tide and the old coast highway; (2) in Pacifica, all the sandy beach, headlands and points (Mori Pt., San Pedro Pt. and Creek, Devil's Slide); (3) in the Montara-Moss Beach area, Montara Point, undeveloped land west of the high-

way adjacent to the Fitzgerald Marine Reserve (to be in an agricultural preserve), and Pillar Point Harbor; (4) in Half Moon Bay, the lands included in the San Mateo Mid-Coast Beaches Acquisition Plan; (5) all beaches and upland support areas between Santa Cruz City and Half Moon Bay, especially Davenport Landing, Scott Creek, and eastern portion of Pescadero Marsh; (6) in the City of Santa Cruz, inholdings at Natural Bridges State Beach, Lighthouse Field, vacant property on East Cliff Drive at the San Lorenzo river mouth, and the vacant land adjacent to the Yacht Harbor; (7) the continuous band of undeveloped shoreline area from New Brighton Beach to the Pajaro River; (8) a continuous band around Elkhorn Slough; (9) in Seaside, Sand City, Marina, and the part of the City of Monterey adjacent to Seaside, the area west of Highway 1; and (10) below the Carmel River, all undeveloped land west of Highway 1 within the Highway 1 viewshed (as defined in the Appearance and Design Element) including the Big Sur area beaches and upland support area, excluding vacant lots in substantially built up residential subdivisions. [I-pl1RA]

South Coast: Publicly owned lands in the coastal zone of this region and, in urbanized areas (S3 through U1), any land in the permit area which comes into the public sector through tax default, gift, or abandonment shall be maintained in public ownership. Such lands should be: (1) preserved and restored as natural areas if endangered or important habitat types exist; (2) held as public open space or developed (possibly through a lease to the private sector) for facilities serving the public; or (3) where habitat preservation or open space/recreational use is not appropriate, used for agricultural production. Land now in public ownership in the permit area shall not be sold for private use without approval of the coastal agency. [from L-pl, L-pl4, A-p2, and A-p3RA]

66. Techniques for Gaining Public Use. Public use of the coastline shall be secured through public purchase, dedications from subdividers, purchase and leaseback, scenic and open space easements, scenic restrictions, resource management contracts, incentive zoning, and the transfer of development rights. [from I-pl1 and A-p28c] Acquisition programs should proceed as rapidly as possible and should include leaseback and life estate provisions as incentives for placing privately-held lands in public ownership and to prevent hardships to present owners. [R-pla] Each affected parcel shall be separately evaluated and the most appropriate and equitable means to secure the public interest selected. [new]

67. Protect Potential Acquisition Areas. Until lands designated for public acquisition can be secured, they shall be protected from development and from abuse through public regulatory powers, and property taxes should reflect this

limitation on their use. If these areas cannot be secured within a reasonable period of time, development that complies with all other Coastal Plan policies may be allowed to proceed. [from R-pla, R-plOc, and A-p30]

PUBLIC INSTITUTIONS AND MILITARY LANDS ON THE COAST

POLICIES

68. Permit Institutions that Provide Public Use. Only those institutions that have the potential for encouraging public use and preserving coastal resources (e.g., marine laboratories, libraries, museums, city halls, and colleges) shall be permitted in the shoreline area. Such uses should be given priority over residential uses in the shoreline area. [I-p12] Approval of such institutional uses shall depend on (1) the amount of public access generated (e.g., public spaces, not private offices, on the ocean side of a building); (2) the degree to which the proposed development takes advantage of a coastal location by utilizing coastal amenities; (3) the way it combines public use with the protection of natural resources; and (4) its visual impact and the relationship to surrounding uses. [I-p12]

69. Maximize Public Use of Federal Lands. Maximum public use of Federal lands should be encouraged. Specifically:

- a. Make Military Lands Available to Public. The U.S. Government should continue and expand its already outstanding program of making military lands on the coast (for example, parts of the Golden Gate National Recreation Area) available for public recreation and preserving vital coastal resources. [I-p16]
- b. Increase Public Access to Military Bases. Public access to the coastal areas of Federal military installations should be increased to the maximum degree consistent with military security and safety requirements and environmental protection. [R-p6f]

- c. Retain Federal Surplus Lands in Public Ownership. If military or other Federal lands and water areas are declared to be surplus, they should be retained in public ownership for public use. Any leasing or development of such areas should be in accordance with a subregional plan (see Policy 183), approved by the coastal agency and consistent with the Coastal Plan. [I-pl6]

Equality of Access

POLICIES

70. Basic Policy: Maximize Access to the Coast for All People. Access to the coast for persons of all income levels, ages, and social groups shall be maximized. Developments that provide recreational and residential access for the general public over a wide range of income levels shall have priority over other private development. [I-pld]
71. Provide Lower-Cost Tourist Facilities. Provision should be made in areas near beaches for tourist facilities (including campgrounds, hotels, youth hostels, recreational vehicle parks, etc.) for low- and moderate-income persons through the use of all available financing techniques, including the tax increment obtained from high-cost coastal housing and tourist facilities. Lower-cost visitor facilities such as campgrounds, rustic shelters, ranch houses converted to inns, bed and board in private homes, summer home rentals where several families can share the cost, and new tourist accommodations that provide some percentage of moderately priced units and short-term rentals of other recreation facilities (e.g., boats) shall be given priority over exclusively expensive facilities (e.g., private residential developments, some yacht clubs). [I-pl4 and from R-pld] Recreational vehicle campgrounds should be provided both by the public and private sectors consistent with other

Coastal Plan policies (see especially Recreation chapter). Where possible, vehicle camping areas should be designed separately from tent camping areas. Such facilities shall be located well back from the water's edge and shoreline pedestrian access provided. [R-p2g]

72. Increase Coastal Access for Low- and Moderate-Income Persons. Housing for persons of low and moderate income shall be adequately provided to increase access for all people to the coast. New developments that provide some percentage of moderately priced units shall be given priority over exclusively expensive facilities. [I-p14] In addition:

- a. Preserve Existing Low- and Moderate-Income Housing. The demolition of low-moderate income housing in coastal neighborhoods shall be permitted only if it can be assured that the new or rehabilitated housing will provide at least the same number and type of dwelling units at the same price in the same general area. [I-p13]
- b. Provide New Low- and Moderate-Income Housing. A significant percentage of new housing within coastal neighborhoods shall serve low- and moderate-income persons and those employed in coastal-related industries and agriculture to the extent that funds are available from State and Federal sources, such as the Community Development Act of 1974. [I-p14] State and national programs to assist low- and moderate-income housing, such as the bills (pending in the State Legislature) to provide increased mortgage funds, shall be encouraged and expanded. [I-p27c]
- c. Regulate Condominium Conversions. Condominium conversions in areas which provide significant rental opportunities for low- and moderate-income persons, the elderly, and families with children (as determined by the 1970 census figures) should be approved only if (1) other rental units are available in the immediate coastal area at similar rental rates (e.g.,

the rental vacancy rate in the coastal area of the local jurisdiction has remained above 3 per cent for the preceding six month time period); (2) first option to purchase is provided to present tenants; (3) ninety days notice of conversion is provided to present tenants. [I-p15]

73. Provide Recreational Access for the Physically Handicapped. Reasonable access and accommodations in recreational areas and facilities shall be provided for physically handicapped persons by complying with State statutes and State Department of Rehabilitation design criteria. [R-p14]

Recreation

Optimum Recreational Use of the Coast

FINDINGS

Coast Provides Variety of Recreational Opportunities. The California coast provides an almost endless variety of recreational opportunities for people to play, to be refreshed, and to be inspired: wide sandy beaches for cooling off from the heat of the city; rocky headlands for exploring; high bluffs for watching the ever-changing ocean; waters for swimming, boating, surfing, and fishing; and tide pools, sea caves, and coastal wetlands for nature study. In short, the coast is a major determinant of the quality of life in California. [R-f1]

Shortage of Recreational Facilities Persists. The coast is heavily used for recreation because 85 per cent of California's population lives within 30 miles of the ocean and because the coast provides many year-round recreational opportunities not found at inland areas of California and other states. Many public and commercial recreational facilities exist along the coastline, but a shortage of facilities persists for almost every popular recreational activity. The exact demand for specific types of recreational facilities is difficult to project, but there will probably be a continued high demand for traditionally popular coastal activities such as fishing, sightseeing, beach use, skin diving, boating, camping, hiking, bicycling, and general day use. [R-f2]

Recreational Pressure Will Increase with Further Development. Large-scale urban development in the coastal zone that does not include adequate internal open space or is not balanced with provision of public recreational areas away from the coastline increases congestion and limits access to coastal recreational resources for all Californians as the local residents use the remaining coastline for all their recreational needs. [I-f12] At the same time, the rapid development of large open spaces inland from the immediate shoreline destroys the scenic open space qualities of these areas and precludes use of these upland areas for recreation (picnic grounds, golf courses, recreational vehicle campgrounds), transportation (parking lots, roads, bus stations), and multi-use commercial services (restaurants, hotels, amusements) that could be linked to the shoreline by trails, shuttle buses, or trams. [R-f5d]

Coast Subjected to Conflicting Recreational Use Demands. The coast makes significant contributions in satisfying the recreational demands of the State's 20 million inhabitants. However, to meet the desires of an ever-increasing population, this irreplaceable natural resource is being subjected to increasing and sometimes conflicting demands for recreational use. When there is a demand for recreational activities that are not compatible with each other, the result can be an intensive activity (e.g., dunebuggying) taking over the use of the area from more passive activities (e.g., sunbathing, beachcombing). Conflicting demand for recreational facilities can also result in the alteration of the coastal environment for one activity (e.g., filling shallow waters for a park) at the expense of another activity (e.g., preserving the water area for boating). [R-f3] Moreover, the construction of roads and parking lots along the immediate shoreline uses up potential recreational areas. Often these support facilities could be located back from the shoreline area. [from R-f5c]

Coastal Recreation and Tourism Benefits State Economy. Although there are no absolute data available that quantify the economic benefits of recreation and tourism along the coastline, according to the California Department of Commerce, they contribute at least \$2.5 billion annually to the California economy and generate over 280,000 jobs. In a recent study done for the Department of Commerce (A Study for the Methodology for a Continuous Tourism Research Program, July 1974), it was determined that the California coastline is a major attraction to visitors from throughout the world. [R-f4]

Recreational Carrying Capacity of Coastal Areas Needs Investigation. Recreational carrying capacity, defined as "the character of use that can be supported over a specified time by an area developed at a certain level without causing excessive damage to either the physical environment or experience of the visitor," depends on the interrelationship of three factors: (1) the environmental or physical capacity, which is the amount and character of use beyond which the natural resource will be unacceptably altered; (2) the social, psychological, or visitor capacity, which is a subjective level beyond which individuals feel the recreational experience is not fully satisfactory because of overcrowding, noise, loss of privacy, etc.; and (3) the facility capacity, which is the maximum level of use the manmade facilities (parking lots, roads, trails, campsites) can accommodate. Facility capacity is not affected by natural constraints and is determined entirely by management decisions. Very little definitive study has been conducted on the carrying capacity of coastal zone recreational areas, though these areas possess certain unique environmental characteristics that do not exist in inland locations. A model similar to the State Department of Parks and Recreation "Allowable Use Intensity Program" could be developed for other carrying capacity assessments. Overuse, environmental degradation, and native flora and fauna declines have occurred in some coastal areas due to the lack of access control suitable to the circumstances. [R-f6]

Recreational Capacity of Coastal Areas Varies. Although each coastal area must be analyzed separately to determine its optimum recreational use level, the recreational capacities of tide pools, sea caves, and coastal wetlands are most often determined by their fragile ecological conditions while the recreational capacities of sandy beaches, bluffs, headlands, bays, and nearshore waters are more often determined by access and the quality of the recreational experience than by the environmental qualities of the sites.

Carrying Capacity Should Not Be Exceeded. To protect the environment of the coast as well as the quality of recreational experiences, recreational use should be controlled according to the carrying capacity of each area. In urban areas where there is road access to much of the coast, it is likely that coastal recreational facilities will be intensively used by large numbers of people so that fragile resources can be adequately protected only by on-site measures such as limiting parking or erecting fences. In rural areas where access to the coast is limited to that provided by Route 1, the extent of recreational use can be limited by the capacity of the road system, which must also serve additional commercial, industrial, and residential development along it. [R-f7]

Coastal Areas May Be Misused. Excessive recreational use can damage the fragile resources of the marine and land environment. Many tide pools have been virtually stripped of all living organisms by people collecting specimens. Some areas, such as marshes and dunes, may be damaged by excessive foot traffic. Islets and offshore rocks that provide protected sanctuary for seabirds and sea lions are disturbed by human intrusion. In some areas, selective hunting and fishing of certain species can deplete these resources. With adequate protection, public education, and in some cases, restoration, most disturbed areas can recover. [M-f8]

POLICY

74. Basic Policy: Ensure Optimum Recreational Use. The optimum potential active and passive recreational use of the coastline consistent with resource protection shall be ensured by: (1) providing ample public recreational opportunities, (2) giving priority to commercial recreation on private lands, (3) reserving the shoreline for coastal- and water-dependent recreational activities, (4) protecting upland areas for recreational support facilities and non-coastal-dependent activities where appropriate, (5) requiring the provision of adequate open space and recreational amenities in new private development, and (6) managing recreational uses to protect coastal resources from overuse and to offer a variety of recreational experiences. [R-p1] (See the following subsections.)

PRIORITY FOR RECREATIONAL USE OF THE COAST

POLICIES

75. Consider Public Recreational Potential Before Allowing Other Uses. The potential of each shoreline property for possible recreational use shall be evaluated before any development that would foreclose such opportunities is permitted. Especially critical are those areas recommended for public acquisition by any Federal agency, by the State Department of Parks and Recreation in the California Coastline Preservation and Recreation Plan and in the 1974 State Park Bond Act program, in city, county, and regional plans, and in the Coastal Plan, and any additional areas such as coastal Federal surplus lands found to be of high recreational value. [R-pla] (See Public Access to the Coast chapter regarding public acquisition of coastal areas.)

76. Commercial Recreation Takes Priority Over Other Private Development. The use of private lands for visitor-oriented development, such as commercial recreation and support facilities (e.g., resorts, restaurants, hotels, and campgrounds) that are designed to enhance the general public's opportunity to enjoy the water-

front and other coastal recreation areas, shall have priority over private residential, general industrial, or general commercial development except for agriculture and coastal-dependent industry. [I-p9, R-plc] Private residential, general industrial, or general commercial developments shall be permitted only if it can be demonstrated that the site is clearly inappropriate for commercial recreation uses (due to location, surrounding land use, accessibility, etc.) or that present and foreseeable future demand for commercial recreation uses is already adequately provided in the area. [new] Such commercial recreation facilities shall be permitted only where consistent with other Coastal Plan policies such as protection of natural resource areas, design standards within communities, etc. [from I-p9] (See also Policy 71 regarding equality of access to such facilities.)

77. Provide a Variety of Recreational Uses near Metropolitan Areas. Priority shall be given to providing a wide variety and numerous facilities to accommodate heavy recreational use and intensive activities along the coastline in areas convenient to population centers. The few remaining large open spaces in southern California (e.g., Camp Pendleton, Santa Monica Mountains, Channel Islands) shall be preserved for predominantly low-intensity recreational use. Where medium- and high-intensity facilities (e.g., parking lots, campsites, and picnic grounds) are necessary to accommodate concentrations of people, these facilities shall be clustered in limited areas where it can be determined that the site has the capacity to withstand more intensive use. [R-p2d] (See section on Controlling Recreation to Protect Resources.)

Regional Amplification

South Coast: Maps of all public purpose areas in the coastal zone (to 5 miles from the m.h.t. line) including beaches, parks, open space and environmental reserves open to the public, and information regarding access to these lands, shall be made available to the public at nominal cost from suitable public agencies. [A-pl4RA] Where regional park facilities are in short supply (e.g. Santa Monica Bay area), public agencies shall encourage the use of beaches for picnicking, hiking,

bicycling, volleyball, children's play areas and other non-consumptive use of the dry sand beach and adjacent areas. The use of portable facilities for certain of these activities shall be encouraged, especially during the winter months. [R-p1RA]

78. Maximize Off-Season Use of Recreational Facilities. Local and regional planning agencies should prepare off-season use plans for coastal recreational areas. These plans should consider using existing beach parking lots for winter recreational vehicle camping and providing outdoor educational programs in picnic areas during low-demand periods, where consistent with Coastal Plan policies. [R-p1e]

79. Institute a Statewide Reservation and Use System. A centralized statewide reservation and use monitoring system for overnight recreational facilities, similar to that used by the California Department of Parks and Recreation, should be instituted by public recreational agencies. The system should eventually include all public and private facilities. [from R-p5f]

RECREATIONAL USE OF SHORELINE AND UPLAND AREAS

POLICIES

80. Reserve Shoreline for Coastal- and Water-Dependent Recreation. To ensure a wide range of recreational activities and to avoid conflicts between incompatible activities, coastal- and water-dependent activities shall have priority in the shoreline area. [from R-p2]

- a. Coastal-Dependent Recreation. Coastal areas particularly suited for specialized coastal-dependent recreational activities (e.g., surfing, SCUBA diving) shall be protected for these uses. Other activities shall be permitted so long as they do not conflict with the enjoyment of the primary resource-oriented activity. [R-p2a]

b. Water-Dependent Recreation. Water-dependent recreational activities such as fishing, surfing, swimming, diving, and boating shall be given a strong and clear priority for use of the immediate shoreline over recreational activities that do not require water access (e.g., off-road vehicle use, vehicle camping, golf). [R-p2b]

c. Criteria for Non-Dependent Activities. Non-water or coastal-dependent recreational activities shall be permitted in the immediate shoreline area only if it can be demonstrated that: (1) there is a long history of high demand for the type of recreational activity proposed; and (2) no coastal- or water-dependent uses would be displaced or precluded by the proposed development or activity. [new]

81. Reserve Upland Support Areas for Recreational Use. Wherever possible, recreational activities and support facilities that do not have to be located on the immediate shoreline shall be located inland and connected to the coastline by trails, bicycle paths, shuttle buses, or trams. [R-p2f]

a. Priority for Public Recreation in Upland Areas. Acquisition and development of such upland areas appropriate for public recreation shall be given high priority. [from R-p2c]

b. Stress Upland Location for Uses that Would Degrade Shoreline. Particular stress should be placed on reserving upland support areas (1) for intensive recreational development that otherwise would require substantial shoreline alterations, and (2) for commercial recreation facilities that would otherwise infringe upon or displace public recreational, educational, or scientific areas on the shoreline. [from I-p9, R-plg, and R-p2c]

RECREATION AND DEVELOPMENT

POLICY

82. Balance Development with Open Space and Recreation Facilities. The amount of new development shall be correlated with precise open space acquisition and

recreational use plans prepared by local agencies, and with provision of on-site recreational facilities determined to be sufficient to serve the new development.

- a. Open Space, Recreation Requirements. Open space and recreational requirements shall be based on standards adopted by the National Recreation and Parks Association unless other standards are determined to be more appropriate for specific coastal areas by the coastal agency following completion of subregional plans.
- b. Cities and Counties Should Assure Adequate Public Open Space. The local government recreation plans should include financing methods and an acquisition timetable for the purchase and improvement of public recreational areas adequate to fully meet these standards in newly developing areas and to substantially reduce any deficiencies in existing areas.
- c. Delay Development Until Plans Adopted. If such precise plans and implementation programs have not been adopted in accordance with coastal agency requirements, new residential development should be delayed until such plans and programs are in effect. [I-p10]
- d. Require Sufficient On-Site Recreation in New Development. New coastal residential developments shall provide internal recreational facilities so that the increased recreation demand by the new residents is less of a burden on nearby public recreation areas. [R-p6c]. In addition, public amenities such as pedestrian walkways, bicycle paths, equestrian trails, open space, and parking areas shall be provided for public use in new developments large enough to accommodate them. [R-p6b]

CONTROLLING RECREATION TO PROTECT RESOURCES

POLICIES

83. Restrict Substantial Alterations on the Shoreline. Recreational uses that do not require significant facilities or extensive alteration of the natural

environment (e.g., tent campgrounds, walk-in campgrounds, picnic areas, hiking trails) shall have priority along the immediate shoreline over recreational uses that require large-scale development or would result in substantial alteration of the natural environment (e.g., hotels, vehicle campgrounds, parking lots).

[R-p2f] Substantial alteration of land and water areas along the immediate shoreline (by dredging, filling, paving, grading, etc.) to accommodate a specific recreational use shall be permitted only if all the following criteria are met:

(1) the proposed use is clearly water- or coastal-dependent (e.g., boating, swimming, fishing); (2) there is a long history of high demand for the use (e.g., public boat launching ramps and hoists, day-use beaches, fishing facilities); (3) there is no less environmentally damaging alternative; and (4) the alteration is in accord with Coastal Plan policies (e.g., wetlands shall not be dredged or filled, bluffs shall not be graded, and the remaining natural sand dunes and beaches shall be protected). [R-p2e]

84. Limit Access and Recreational Use Where Necessary. Types of recreational and educational use, as well as public access, shall be controlled where necessary to minimize human impact or other damage to natural resources (e.g., tide pool collecting, underwater fishing, trampling of marshes, traffic on dunes and bluffs, etc.), to ensure continued productivity and recreational enjoyment of resources, and to protect public safety. [M-p10a and from R-p5b] Where information is available to determine the environmental carrying capacity of a coastal resource, the designed capacity of roads, parking areas, and other support facilities shall be kept within the environmental carrying capacity of the natural resource.

[R-p5d] Other appropriate natural areas should be made available to reduce overuse of existing areas. Enforcement of regulations should be strengthened and consolidated, with State and Federal assistance for local or State agency inspection programs. [M-p10a]

Regional Amplifications

South Coast: Until a coastal access and use management system can be established, accessways open near urban population centers in the South Coast Region which provide entry to areas of exceptional marine quality shall be monitored by local authorities so no degradation of marine resources occurs. Areas of special concern include existing and proposed marine reserve areas; the Los Angeles-Ventura County line to Malibu Point, Resort Point to Abalone Cove, Malibu Lagoon, and along the Irvine Coast from Cameo Shores to Abalone Point. [M-p5RA] The Federal government shall be encouraged to complete needed facilities for carefully controlled public access to Seal Beach National Wildlife Refuge. [M-p2RA] High priority areas for increased protection and public educational programs in the South Coast Region include Malibu Creek and Lagoon (Surfrider Beach), Palos Verdes Peninsula, Corona del Mar, Laguna Beach, Ballona Creek tidal system, Upper Newport Bay, Doheny State Beach, Bolsa Chica State Beach, Irvine Coast, Catalina Island, and San Clemente Island. [M-p10RA] Public access to and within marginal land areas of inlets, estuaries, and bays shall be provided. Ecological fragility may require that numbers of visitors be limited, or that access be prohibited during certain periods of time, but total prohibition of public access will only be considered for rare and extremely fragile natural areas. [A-p12RA]

San Diego: To reduce or prevent accelerated bluff erosion caused by foot traffic or other actions of man on bluff faces, while at the same time providing for adequate beach access in coastal bluff areas, a beach access and bluff preservation program shall be implemented by the governmental agency having jurisdiction for those areas where the actions of man are causing accelerated erosion.

85. Restrict Off-Road Vehicles in the Shoreline Area. Off-road vehicles and trail bikes shall not be accommodated on beaches, dunes, and bluffs in the immediate shoreline area with the possible exception of the portions of Pismo Beach in San Luis Obispo County and Ten Mile Beach in Mendocino County that are presently used for this purpose. [R-p2g]

86. Establish Long-Range Program to Protect Resources and Manage Recreational Use. A long-range program to protect coastal recreational resources from over-use shall be established jointly by the coastal agency and other public recreational agencies. This program shall coordinate the planning of coastal access with the desired recreational use levels along the coast, and shall ensure that public recreation areas are adequately managed and maintained to achieve

this end. This program should include effective restraints on recreational use at peak times and inducements to use at off-peak times. [R-p5c]

- a. Criteria for Coastal Use Zones. The foundation of this program shall be the designation of four classifications of coastal use zones: Intensive Use Zone, Moderate Use Zone, Light Use Zone, and Remote Zone. The criteria that shall be examined in the process of designating these coastal use zones shall include, but not necessarily be limited to, the following:
(1) the area's environmental uniqueness or fragility; (2) the present and potential use; (3) the coastal recreation demand in the region; (4) the area's proximity to major population centers; (5) the availability of major transportation corridors; (6) the area's value as an isolated and relatively low-intensity recreational area; (7) the area's ability to accommodate intensive recreational use; and (8) the need for a variety of recreation facilities. [R-p5c]
- b. Distribution of Use Zones. Except to the extent that natural features determine coastal zone designations, the four types of coastal zones shall be relatively evenly distributed throughout each Region with the more intensively used areas near major population centers. [R-p5c]
- c. Improving Analysis Techniques for Use Levels. Research should be undertaken by State colleges and universities, the Department of Parks and Recreation, the Department of Navigation and Ocean Development, the coastal agency, and local park agencies on ways of improving analysis techniques for determining recreational site carrying capacity; once developed, these techniques shall be used by the coastal agency to evaluate all coastal recreational sites, and management action shall be taken to adjust recreational use levels accordingly. [R-p5e]

Regional Amplifications

South Central: The Guadalupe Dunes should be preserved for wilderness and/or low-intensity recreational use. [R-p2RA] The Channel Islands should not be developed significantly beyond their present levels. Those islands which now are or in the future come to be publicly owned should be administered on a low intensity, limited entry basis. [R-p5RA]

San Diego: Interim beach access and use management zones are: (1) Intensive Use Zone--Imperial Beach to Zuniga Point, Ocean Beach to Tourmaline Surfing Park, Seal Rock to La Jolla Cove, La Jolla Beach and Tennis Club to Scripps Pier, Del Mar City Beach, Cardiff State Beach to San Elijo State Beach, Moonlight State Beach, South Carlsbad State Beach, Carlsbad State Beach, Oceanside, and San Onofre State Beach; (2) Moderate Use Zone--Border Field, Ladera Street to Ocean Beach Pier, Tourmaline Surfing Park to Seal Rock, Black's Beach, Torrey Pines State Beach to Del Mar (17th Street), Solana Beach to Cardiff State Beach, Sea Cliff County Park, Leucadia, South Carlsbad State Beach to Carlsbad State Beach, Carlsbad, Camp Del Mar, and San Mateo Marsh (intensive nodes may be located through moderate use areas); (3) Light Use Zone--Point Loma (southern tip), Old California Western University Property, Scripps Pier to Black's Beach, Black's Beach to Torrey Pines State Beach; and (4) Remote Zone--Point Loma (Navy property) and Camp Pendleton. [R-p6RA]

87. Encourage Education on the Coastal Environment. Courses of study focusing, at least in part, on the environment of the coast as a valuable resource to be maintained, preserved, and enhanced should be introduced into the public school system at elementary and secondary levels. State funding for such educational programs should be provided. County school offices should be consulted to recommend development of educational components when recreational areas are being planned. [R-plOf] Signs and interpretive programs should be provided in accessible natural areas to increase public awareness and encourage proper use of resources. [new]

Coastal Reserve System

FINDINGS

Many Coastal Resource Areas Need Special Protection. Many of the resource areas described in the marine, coastal land, and marmade resources chapters need the protection of public ownership. Some natural and historical areas are already preserved--for example, in military lands, wildlife refuges, and parks--but many unique and valuable areas of the coast are still unprotected. [from L-f5]

Without special protection, these irreplaceable, delicate, and outstanding examples of the coastal environment and its historic features may be threatened by development and by intensive recreational uses. [from R-f12]

Resource Areas Offer Opportunity for Study as Well as Recreation. The coastal land environment is composed of complex, interrelated ecosystems that are as yet not fully understood. Their study can be a source of great enjoyment as well as benefit to man. [new] In the marine environment, rocky and sandy intertidal areas, islands, islets, offshore rocks, kelp beds, reefs, and wetlands support rich and often unique marine life. Many coastal sites, such as the Channel Islands, have been designated by local, State, or Federal agencies as having special biological or natural resource values. These areas also often offer important recreational, educational, and scientific opportunities. [M-f8]

A Coastal Reserve System Can Protect Resources While Providing Public Recreation and Education. One of the problems involved in effective management of the fragile resources of the coastal zone is the lack of public awareness concerning the coastal environment. Establishment of education and research programs will provide baseline data useful in making management decisions relative to carrying capacity and change in level of environmental quality as times goes by. [R-f12] Establishment of a comprehensive coastal reserve system can assure such educational and research uses, while providing managed recreational uses. [new]

POLICIES

88. Establish a Coastal Reserve System. A coastal reserve system should be established to protect valuable natural, historic, and archaeological resources of the coast and to promote recreational and educational use of the coastal environment consistent with resource protection. [from M-p10c, R-p10a, R-p11b, and L-p1] Specifically:

- a. Areas to be Included. The system should include: the areas recommended in the California Coastline Preservation and Recreation Plan (Department of Parks and Recreation), in Appendix IX, Education and Research, of the Comprehensive Ocean Area Plan, and by the State Department of Fish and Game; [from L-p1 and R-p10a] all islets, offshore rocks, and other special marine features (such as submarine canyons and banks, kelp beds, etc.) as identified in the Coastal Plan or by other State and Federal agencies; [M-p10c] historical sites identified by the State Department of Parks and Recreation in the California History Plan and the second phase Inventory of Cultural Resources or in the Coastal Plan; [A-p2b] and other ecologically significant areas identified in the Coastal Plan or by the coastal agency.

(Several regions have designated priority sites for reserve acquisitions in Part IV, in addition to the regional amplifications below.)

- b. Additional Sites Should be Designated. Additional designations of ecological reserve areas should be made, based on the following criteria (areas meeting more than one criterion may be especially important):
- (1) restricted natural communities--ecological areas which are scarce, involving only limited area;
 - (2) rare and endangered wildlife species habitat;
 - (3) rare and endangered plant species range;
 - (4) specialized wildlife habitat;
 - (5) outstanding representative natural communities;
 - (6) sites with outstanding aesthetic or educational value; and
 - (7) wilderness or primitive areas.
- The coastal agency should be adequately funded to inventory natural habitat areas and to establish the acreage needed to support the resident population of plants and animals so that additional reserve areas can be appropriately designated. Sites should be large and numerous enough, and appropriately located, to ensure that vegetation and wildlife will not only survive but thrive, that the genetic health and diversity of plant and animal species will be sustained, and that the catastrophic effects of a major fire or flood would be minimized. [L-p1]

Regional Amplifications

Central Coast: As an alternative to public ownership, sites of scientific importance can be protected by the establishment of private preserves where appropriate, as within Del Monte Forest. The existing system of tracts so protected could be rounded out with the addition of remaining undeveloped old growth Monterey Cypresses, the balance of the Gowen Cypress-Bishop Pine grove on Huckleberry Hill, habitat areas for the endangered dune wildflowers (Menzie's Wallflower and Tidestrom's Lupine), perhaps a remnant of the unusual brilliant white silica sand dunes, and several major archaeological sites. [R-p1RA] All the remaining Flandrian and recent dunes (as mapped by Cooper, 1967) shall be preserved to the greatest extent possible through acquisition or other methods. [L-p1RA] Elkhorn Slough and its environs, and the southern portions of the slough system composed of Moro Cojo and Tembladero Sloughs, should be fully protected by public acquisition and careful management. [L-p2RA]

South Coast: The reserve system shall be expanded to embrace significant headlands and associated islets, rocky intertidal areas, submarine canyons, kelp forests and submarine banks. Areas of highest priority are: (1) along the Malibu coast, from the County line to Malibu Point, including kelp beds, islets and reefs, rocky intertidal areas, Point Dume and Dume Canyon. Selected intertidal areas, kelp beds, and reefs shall be designated as natural reserves and limited to scientific and research use, to natural stock replenishment and to carefully controlled public observation. A kelp forest interpretative program shall be established to expand public and school appreciation of the high productivity and public values of these submarine forests. This program shall include self-guided underwater tours, tours conducted by marine naturalists and onshore displays and exhibits. Management and protection of the marine environment here and on the Irvine Coast shall be closely coordinated with management of the shore and uplands. Proposals for a State or national mountain-marine park shall be supported; (2) along the Central Orange County or Irvine coast, from Cameo Shores to Abalone Point, including the kelp beds, the sandy and rocky intertidal zones, Pelican and Reef Points, and reefs and islets. A combined land-marine park system shall be established; (3) the Palos Verdes Rocky Shore Reserve between Resort Point and Point Vicente (proposed for use within the University of California Natural Land and Water Reserves System). The scenic and natural values of the rocky intertidal area along Portuguese and Inspiration Points shall be incorporated into compatible open space uses for the Portuguese Bend Landslide Area; (4) the intertidal and nearshore environment along Catalina and San Clemente. Selected kelp beds and reefs shall be designated as natural reserves. All islets shall be protected as sanctuaries for seabirds and marine mammals; (5) a public observation and interpretative center at Crescent Bay Point in Laguna Beach. Marine life on Seal Rock including sea lions, shall be protected from human disturbance; and (6) a public scenic overlook at Dana Point and San Mateo Point. [M-pl0RA]

89. Manage Reserves for Resource Values. All potential reserve areas should be managed for optimum natural resource values, and habitat values should be restored and enhanced. [M-pl0c] Every effort should be made to provide public access for educational and recreational purposes. [R-pl0d] Information and interpretation programs should be initiated or expanded where appropriate, with supervised or self-conducted tours, public education and school instruction, and signs to encourage proper use and enjoyment of marine and coastal land natural resources. [M-pl0b and R-pl0e] County school offices should be consulted to recommend development of educational components in the planning of reserve areas. [R-pl0f] However, public access and recreational uses should be restricted and controlled as necessary to protect the natural or historical resources.

[R-p10d] Unique and fragile biological communities should be protected as scientific and educational reserves, with limited public access. [M-p10]

90. Establish a Coastal Reserve Board. A coastal reserve board shall be formed to assist the coastal agency in coordinating the establishment of the reserve system. [R-p10b] Specifically:

- a. Board Should Review Acquisition and Management Programs. This board shall review the recommendations of the Comprehensive Ocean Area Plan and other relevant reports, suggest additional areas to be included, develop plans and strategy for acquiring and maintaining reserves, facilitate cooperation and coordination among relevant organizations and agencies, explore means for financing the acquisition program, and monitor the management of the reserves. [R-p10b]
- b. Composition of Board. The board shall have a membership that includes educators, biologists, coastal engineers, ecologists, geologists, paleontologists, geographers, archaeologists, historians, recreational planners, coastal planners, and representatives of public and private organizations and agencies involved in acquiring and managing reserves. [R-p10b]

Coastal Trails System

FINDINGS

Increase Accessibility to the Coastal Zone Through Coastal Trails System. A system of coastal trails, (including waterways valuable for rafting, canoeing, and kayaking) and overnight shelters for hikers, bicyclists, and equestrians would make more of the coast accessible to more people, would link population centers with recreation facilities, and would allow people to enjoy the scenic qualities of the coastline. Coastal trails being planned and developed by public agencies will be coordinated and linked into a State coastal trails system as part of the California trails system plan being prepared by the State Department of Parks and Recreation, which will coordinate the overall trails system with local and regional agencies and organizations. [R-f10]

Increase Bicycle Riding Facilities in the Coastal Zone. Bicycle riding is an inexpensive, non-environmentally degrading transportation alternative that is also a form of recreation in itself. Although bicycles can be used on existing roadways, mixed bicycle-auto traffic is often dangerous to riders and can adversely affect traffic flow. Increased bicycle use in the coastal zone should be strongly encouraged by giving high priority to the construction of special bike lanes, the provision of bike storage racks at coastal destinations, and the modification of transit vehicles to accommodate bicycles. [T-f12] (See also the Transportation chapter.)

POLICY

91. Establish a Coastal Trails System. Hiking, bicycle, and equestrian trails should be established as a continuous system along the coast, consistent with the general planning concepts and safety and design standards developed by the California Department of Parks and Recreation. To this end: [R-p8 and T-pl5]
 - a. Public Responsibility for Trail Development. The Department of Parks and Recreation should be adequately funded to coordinate the implementation, maintenance, and policing of the State coastal trails system, and should be empowered to use eminent domain to acquire the trail rights-of-way where all other means of securing access fail. [R-p8k] Individual trail segments should be connected over State coastal trail routes (to be designated in the final Coastal Plan in cooperation with the State Department of Parks and Recreation, the California Department of Transportation, other public agencies, and the general public.) [R-8pc] Public agencies should develop coastal trail segments through areas along the coast within their ownership or jurisdiction. [R-p8a]
 - b. Best Locations for Coastal Trails. Priority should be given to establishment of trail systems in and near urban areas, with connecting links established as demand and resources dictate. [R-p8b] Where appropriate, the coastal trails system should connect existing inland and beach access trails, parks, and historic sites. [R-p8d] The routes should utilize features such as ridgetops, wide beaches, abandoned railway beds, and unused roadways. [R-p8c] To protect agricultural lands, trails should

be located between fields and along existing farm roads, and should cross croplands only where there is no feasible alternative; provisions such as fencing and harvest season detours should be made to protect farm products. [R-p8e]

- c. Design of Coastal Trails. The trails system should be designed to accommodate only hikers, bicyclists, and equestrians. [R-p8h] Bicycle paths should be separated from the road, where possible, but bicyclists should not thereupon be barred from the road. Overpasses, underpasses, or other safe means of bike crossing should be provided where necessary. Existing roads where bikes share right-of-way with autos should have a maintained bike lane on each shoulder of adequate paved width, and unsafe storm drain grates should be replaced; bikes should have exclusive use of this lane except when autos are pulling off the road or making turns. [T-p15] Special trails, such as Braille trails and paved paths for wheelchairs, shall be developed to provide access to various coastal habitats for physically handicapped persons. [R-p14]
- d. Provide Campgrounds and Other Facilities. Campgrounds with basic necessities should be provided at appropriate intervals along the coastal trails system, and camping should be restricted to these designated areas. A well-planned hostel system should be included in the trails system. [R-p8g] Coin-operated lockers, bicycle racks, or other safe means for storing bicycles should be provided and maintained at designated areas along the trails system. [R-p8i and T-pl4c]
- e. Require Right-of-Way Dedication. The dedication of trail rights-of-way shall be required as a permit condition where the trail routes cross properties proposed for development. [R-p8j and T-pl4a]

Regional Amplifications

North Coast: Consideration should be given to the possibility of using sections of old Highway 101 as a coastal bicycle trail. Another area where a bicycle trail could be useful is the Arcata bottomlands along the Mad River Beach Road. [R-p8RA]

South Coast: Where feasible pedestrian and bicycle paths shall be provided between all beaches and other public areas to restore linked access to these areas where it has been interrupted by development, such as residential, commercial, industrial, and automobile and railway transportation facilities. [A-p17RA]

Visual and physical access to the sea and to activities which border the sea in urbanized areas (areas U2 and U1) shall be predominantly focussed on paths for pedestrians or cyclists which allow visual access to congested or hazardous areas where public access is not permitted (some harbor areas, refineries, some residential areas, etc.). In these areas access by automobile shall, when in conflict with pedestrian or bicycle access, be subordinate. Such routes shall be designated as scenic bicycle paths or scenic promenades. [A-p14RA]

Existing trails leading to but not reaching the shoreline shall be so extended. New trails should be established in the Santa Monica Mountains to connect existing parks, open up inaccessible areas to hikers and equestrians, and to provide alternative routes to the sea. A trail route shall also be established through the Los Angeles Harbor. [R-p8RA]

Marinas

FINDINGS

Demand for Coastal Boating Facilities Is High. Boating is an enjoyable activity along the coast--both for recreation and fishing. The demand for boating facilities is so great that the berths planned for construction over the next ten years will barely cover the existing demand. [R-f11]

Boating Facilities Can Be Environmentally Damaging. Boating facilities, however, can cause serious environmental damage from the extensive alteration of the marine environment, especially by dredging and filling of coastal wetlands. Moreover, in boat maintenance areas where sanding and scraping of paints takes place, harmful pollutants may drain into coastal waters. (See Marine water quality section.) And exclusive boating facilities can exclude access to the coast. [R-f11 and new]

Increased Boating Can Be Accommodated Without Adverse Effects. It appears possible to accommodate increased boating activity without serious environmental damage by encouraging more thorough use of existing boats and boating facilities, by developing more dry storage and launching facilities, and by building any new marinas in areas less fragile than coastal wetlands. [R-f11]

92. Accommodate New Boating Facilities Without Dredging or Filling. The dredging or filling of coastal wetlands to accommodate new boating facilities shall be prohibited. [R-p9] New boating facilities may be permitted, where they would not have significant adverse effects, in natural harbors (e.g., sheltered areas in the deeper waters of bays, estuaries, and coves) or in new protected water areas (e.g., areas created by the dredging of existing low level dry lands or by the placement of floating wave barriers). All new boating facilities shall be consistent with Coastal Plan policies and local and regional plans. (Potential sites will be designated in the final Coastal Plan by the Coastal Commission in cooperation with the Department of Navigation and Ocean Development, Department of Fish and Game, local boating experts, and marine scientists.) Each proposed alteration shall require a careful analysis with the final determination made on the basis of the long-term environmental effects. [R-p9e]

Regional Amplification

South Coast: The short term rental of small boat craft, such as snipes and lightnings and other small craft, shall be encouraged and should be provided in existing and proposed boating areas. While there is insufficient information at this time, marina proposals which appear to have the least potential for adverse impact are the Dana Point Marina expansion (900 berths in the west basin), and the Long Beach Harbor Marina (3,000 to 4,500 berths). Consideration of the Cabrillo Marina should be postponed until a community plan is prepared for the San Pedro area. If the new plan calls for the retention of existing low-density and neighborhood character in the Cabrillo Beach area, then the Marina must be reconsidered in the context of its effect on those community goals. Minor marina expansions such as proposed for Alamitos Bay and Marina del Rey may be approved provided some maximum capacity figure is established and accepted by the Coastal Commission. Because Paradise Cove is the only boating facility offering protection from storms from Marina del Rey to Port Hueneme in Ventura County, its mooring capacity should be increased by 50 to 100 spaces. There should also be some mooring capacity increase at Santa Catalina Island and San Clemente Island. Marina proposals at the Santa Ana River mouth and Bolsa Chica require large reductions in scale before they would be compatible with wetland preservation and restoration goals. [R-p9RA]

93. Maximize Use of Boating Facilities. The present and future need for new coastal boating facilities shall be reduced by use of methods that would not have

significant adverse effect on the environmental quality of the coast. Such methods may include: (1) developing dry storage areas and stacking devices with nearby public launching to the greatest degree possible in all new and existing harbors; (2) increasing the number of public launching facilities; (3) providing additional berthing space in existing harbors; (4) limiting nearby non-water-dependent land uses that congest access corridors and overtax boating support facilities; and (5) maximizing the use of each boat by encouraging the multiple ownership of boats, by giving priority for slip rental in existing small craft facilities to boats available for rent to experienced boaters (i.e., those individuals who have successfully completed U.S. Coast Guard-recognized boat operation courses), and by giving priority for the use of public funds for the expansion or development of small craft harbors to facilities that have devised acceptable systems for encouraging rental and multiple ownership of boats. [R-p9a,b,c,d]

94. Provide Public Access to Marinas. The maximum recreational value of existing and future marinas shall be achieved by providing the general public with greater access to in-water marina facilities (e.g., piers, floats), consistent with necessary security and public safety precautions. (Appropriate agencies and leaseholders should participate in resolving safety and security problems.) Designs for both new marinas and expansion projects shall include in-water facilities designated for use by the general public. [R-p9f]

Financing Coastal Recreation

FINDINGS

Additional Funds are Needed to Finance Coastal Recreation. The California Department of Parks and Recreation has estimated that it would cost over \$1 billion to acquire, protect, and develop coastal public recreational facilities needed by 1980. Projections indicate that the demand and price of lands for public recreational pursuits will continue to escalate, commensurate with the competition for coastal locations by other land uses. The public funds available for recreational projects that have traditionally been insufficient to meet past needs have been further reduced by the enactment of the Federal Revenue Sharing Act of 1972.

Potential Sources of Funds. The following are potential sources of increased funding for coastal recreational facilities: [R-f14]

- (1) The Federal Land and Water Conservation Fund, which derives much of its revenue from the coastal zone in the form of royalties paid to the government for the extraction of minerals from offshore lands.
- (2) Local governments, which could use more of their funds available through the Federal Revenue Sharing Act for coastal recreational projects.
- (3) The 1973 Federal Highways Act, which provides up to \$2 million per year for three years for bicycle facilities.
- (4) New State programs which might include: (a) a bond act to purchase large portions of the coastal zone with a leaseback of those areas not needed for recreation to help pay off the bond; (b) tapping the revenues generated by mining, kelp harvesting, and the resumption of oil drilling in State-owned tidelands (if such drilling is allowed); or (c) a special real estate transfer tax on the sale of coastal properties.
- (5) The California Environmental Protection Program Fund, which is supported by fees for personalized environmental license plates, provides up to \$3 million per year for environmental projects.
- (6) State grant programs such as that provided in AB 3927 (1974) which would have provided \$3 million from the General Fund enabling cities and counties to have the funds needed to fully complete a coastal trails system. [R-f14]
- (7) State park system entrance and user fees. Some monies from other recreational use fees are available to the Department of Parks and Recreation for acquisition, planning, and development of the State Park system as a result of SB 1644 approved and signed into law in the 1973-74 legislative session. [R-f14RA]

Beach Maintenance Costs Need Reevaluation. When local communities are responsible for maintaining beaches used by the general public, the cost of maintenance is sometimes inequitably borne by the local taxpayers (when public costs exceed the "return" to the local economy) while there is an inequitable economic benefit to people from other areas who do not share the maintenance costs and to the local recreation-related businesses which profit from the spending of visitors to the coastline. [R-f15]

POLICIES

95. Increase Funds for Coastal Recreation Facilities. Funds needed for public recreational facilities along the coastline should be provided. To this end:
 - a. The Federal government should increase the maximum limit of the Federal Land and Water Conservation Fund by using the increased royalty income or higher value from the expanded extraction of offshore minerals to further support the fund and should earmark the increased funds for spending on coastal projects. (Refer also to Part III.)

- b. Special funding programs should be provided, such as bond acts with purchase and leaseback provisions, dedication of State revenues from any extraction of mineral resources in State-owned tide and submerged lands, or special taxes on the sale of coastal properties.
- c. The State should allocate funds from the California Environmental Protection Program Fund for coastal recreation and reserves such as interpretive facilities and programs, archaeological surveys, or research on carrying capacity.
- d. A State grant program should be established to ensure that cities and counties will have adequate funds needed to complete portions of the coastal trails system in their jurisdictions. Legislation similar to AB 3297, which would have provided \$3 million from the General Fund for this purpose and was approved by the Legislature but not signed into law in the 1973-74 legislative session, should be enacted. [R-p12]

96. Establish Equity in Cost of Maintaining Beaches. Because local taxpayers can be inadvertently penalized when a local municipality is responsible for maintaining beaches used heavily by inland residents, county, State, or Federal governments shall assume greater responsibility for paying some of these costs in communities where it can be established that this inequity exists. Legislation such as AB 3611 (which would have provided funds to help rectify this inequity and was passed by the Legislature but not signed into law in the 1973-74 legislative session) should be reintroduced. [R-p13]

Transportation

Transportation Planning and the Coast

FINDINGS

State Transportation Planning. Planning for all modes of transportation in California is conducted by the Department of Transportation (in the Business and Transportation Agency) and by statutorily designated regional transportation planning agencies (RTPAs). A statewide California Transportation Plan now being prepared by the State Department of Transportation will be presented for adoption to the State Transportation Board this year and then submitted to the State Legislature by January 1, 1976. [T-f1]

Emphasis on Vehicular Transportation. Current State transportation planning still heavily emphasizes vehicular transportation facilities and, to some extent, airports. Port, railroad, and mass transit planning are still not given the weight necessary for truly comprehensive transportation planning. [T-f1]

Inter-Agency Coordination Needed. The relationship between local and regional transportation and planning agencies is a source of conflict in some areas, creating a need for interagency coordination. Additionally, local municipalities with State or Federal assistance, or through their own capital improvement programs, carry out their own street and highway improvement programs. In coastal areas, such improvements (by creating developments that increase traffic and parking) can often adversely affect coastal accessibility to resources of regional or statewide significance as well as the mobility in and among coastal communities. [T-1]

Factors Influencing Inter-Regional Policy Decisions. The level of urbanization, type of terrain, the traffic mix, and the influence of corridor traffic between major metropolitan areas (e.g., San Diego--Los Angeles) are crucial factors in making inter-regional policy decisions. [T-f15]

Traffic and Parking Congestion Critical in Coastal Zone. A pressing transportation problem in the coastal zone is traffic and parking congestion. Congestion is actually a cluster of problems appearing in many forms: (1) workday rush-hour congestion in metropolitan regions; (2) weekend, holiday, special events, and summer recreational traffic and congestion along urban and intercity coastal routes; (3) parking and local traffic congestion in coastal communities; (4) decreased roadway capacity and safety resulting from conflicts between different types of traffic; and (5) increased air and visual pollution caused by slow-moving traffic. In addressing these problems, coastal transportation policy and planning must deal with the characteristics and limitations of automobile traffic in a high-use recreational area (including special recreational peak travel periods, longer average trips, and recreational trips where the experience of driving along the coast is an important part of the trip) as well as the effects of commuter traffic. [T-f4]

Strategically Plan Coastal Access Improvements. Transportation systems are needed to improve public access to coastal resources. But certain kinds of improvements to the transportation system may change the character of existing natural resource areas and may lead to the expansion of urban centers or the creation of new ones. Coastal access improvements of all types--roads, transit services, bikeways, and footpaths--must be strategically planned to serve the following goals: provision of public access to the oceanfront; service to residential, recreational and commercial areas; and the protection of manmade and natural resources of the coastal zone. [T-f6]

Emergency Transportation Needs Are a Special Problem. The coastal zone has experienced blockages of roads and railroads because of slides and severe flooding. In 1964 the coastal area of Mendocino County was isolated for several days. Adequate airport facilities are important for search-and-rescue and forest fire-fighting operations. The Coast Guard provides boats and helicopters for emergencies along the coastline and harbor police and fire departments serve the port areas. Bus systems are an important means of evacuation. Communication among the operators of all emergency transportation systems is essential. Existing facilities are considered adequate for expected situations. [T-f16]

POLICIES

97. Plans Should Consider Coastal Concerns. The coastal agency should participate directly in ongoing local, regional, and State transportation planning to ensure that all transportation concerns (e.g., weekend travel) and resource protection goals (e.g., air quality, energy conservation) of the Coastal Plan are considered in regional and State transportation plans.

Principal concerns are as follows: [T-p1a]

a. Weekend, Holiday, and Special Events Travel Requires Special Attention.

State laws that now require local, regional, and State agencies to prepare transportation plans should be modified to require the addition of a weekend, holiday, and special events travel component to the plans as they affect access to and within the Coastal Zone. [T-p2a]

This component should be prepared by a technical study group composed of representatives of the coastal agency, the State Department of Transportation, Regional Transportation Planning Agencies, and local jurisdictions. The study group should determine the compatibility of Coastal Plan policies with existing transportation plans and should

make recommendations for modification of transportation plans and the Coastal Plan, where appropriate, in order to ensure plan consistency.

[T-p2b]

b. Encourage Energy-Conserving and Non-Air-Polluting Transportation Forms.

Transportation plans should include provisions for bicycle lanes and paths and for public buses, trains, and other energy-conserving and non-air-polluting transportation modes to the maximum extent possible.

The Legislature should mandate that the Circulation Element of local General plans include a section on bike paths and lanes. [new and from E-p3b]

c. Consider Emergency Transportation Needs. Transportation plans should include consideration of emergency transportation needs. [T-p17]

98. Review of Coastal Transportation Plans. The coastal agency shall review, modify if necessary, and approve or disapprove those aspects of State, regional, and local transportation plans for coastal areas that affect coastal resources or coastal access (e.g., roads and transit systems to and along the coast, inland-to-coast highway segments, ports, airports) as described in the Coastal Plan. [T-plb]

a. Permit Authority for Projects Included in Approved Plans. Where a State, regional, or local transportation plan has been approved by the coastal agency, the permit authority over specific projects (within the coastal agency's jurisdiction) shall consist of requiring conformity to coastal policies through mitigating measures and shall not extend to denying projects where they otherwise conform to the approved plan. [T-plc]

b. Permit Authority for Projects Not Part of Approved Plans. The coastal agency should have the authority to review, recommend changes inland, approve or reject proposals for transportation construction and development that directly affect coastal resources and coastal access that are not part of a plan approved by the coastal agency. [T-plc]

Land Transportation

HIGHWAY 1 AND COASTAL ROADS

FINDINGS

Multiple Types and Modes of Traffic on Coast. Along the urbanized coastline are many different types of traffic (commuter, recreational, local) and a variety of traffic modes (cars, buses, trucks, bicycles) that all use the same road facilities. This combination of types and modes causes conflicts that greatly increase traffic congestion. [T-f14]

Roadway Capacity and Traffic Flow. Increased road capacity can initially work to reduce congestion on coastal roads, increase traffic flow, and improve the level of service. In many cases, however, expanded road capacity is absorbed by traffic generated by additional developments, so the resulting overall level of service is often not greatly improved and in some cases is diminished. [T-f2]

Adverse Impacts on Highways or Coastal Resources. The automobile is the principal means of transporting people to the coast, but roads can have adverse environmental impacts on the coast. Poor construction methods can cause soil erosion, resulting in mud- and landslides, water pollution, flooding, and fire hazards, can reduce tidal flushing in coastal wetlands and lagoons, and can destroy natural ecosystems. Valuable coastal land and beach areas can be taken for road construction. Auto-generated air pollution can be a significant problem in coastal valley areas. High noise levels create an unpleasant experience for people and can also be harmful to wildlife. Some of the natural beauty of coastal areas has thus been destroyed by the construction of roads. [T-f5]

Highways Induce Growth, Impede Access in Some Coastal Areas. Development is most likely to follow highway construction when a new or improved road is provided in a desirable area of the coast near a growing metropolitan region. Where road improvements spur development by placing coastal areas within commuting distance of urban employment centers, such development can impede coastal access for all users in two ways: by decreasing the amount of potential recreational land available while increasing demand for recreational use in the immediate area; and by increasing traffic loads on coastal roads, causing traffic and parking congestion problems. On the other hand, new or improved roads are not as likely to spur additional development in congested already-developed areas, or distant rural areas, or where growth is effectively managed through direct land use controls. [T-f3]

Coastal Scenic Roads Need Protection. The State Scenic Highway Program was established in 1963 to protect viewshed corridors along State scenic roads. In 1965, the California Legislature passed the California Parkway Act to complement the Scenic Highway Program but it was never funded. The Parkways serve as "ribbon parks" giving access to a number of recreational areas along with preserving particularly unique scenery. These ribbon parks are desirable in some areas of the coast but the scale of the parks does not lend itself to all coastal areas. Therefore, a lesser-scale or in-between type of parkway is necessary, and could be encouraged by amending existing

legislation or drafting new programs for parkways serving all the various parts of the coast. [T-f9]

POLICIES

99. Relate Land Use Decisions to Transportation Capacity. Development controls should be the principal means of relating land use and coastal resource protection decision policies to transportation capacity. However, where the road system capacity is or should be limited based on coastal policies, a system of budgeting the remaining or planned capacity should be developed so that private residential and commercial development will not limit public recreational and scenic uses of the coastal road system. [T-p4]

- a. Create Capacity Budget for Coastal Roads. A "capacity budget" should be determined for each through road segment (existing, new or expanded as approved by the coastal agency) along the coast and intersecting with the coast. The Coastal Plan indicates the remaining capacities of several coastal road segments and, to the extent possible, balances this remaining capacity with the traffic impacts of new development so that a portion of the remaining capacity can be used for recreational access. For those areas of the coast where this has not been done the coastal agency shall budget the remaining capacities in accordance with the adopted Coastal Plan. For development-impacted road segments, the coastal agency should determine (1) levels of service needed for peak periods and normal traffic, and (2) what portion of capacity, given that level of service, should be allocated to the uses proposed and what portion should be reserved for other public and private uses. [T-p4]
- b. Allocate Development According to Remaining Capacity. New development in the coastal zone should be evaluated with respect to the remaining road capacity and should not preempt that portion of the budgeted capacity set aside for recreational access and for coastal-dependent

uses. [T-p4] Development that would overburden road capacities needed to accommodate public access to the coastline shall not be built in coastal areas served by roads that are presently used to near capacity. [T-p6d]

c. Preserve Scenic Nature and Recreational Capacity of Rural Highway 1.

Highway 1 in rural areas of the California coastline shall be kept a scenic two-lane highway. [R-p4a] Improvements shall be limited to those needed for safety and for developing vista areas, parking and other amenities of scenic routes (see Policy 102). [R-p4b] A substantial portion of the road's capacity shall be allocated to recreational use, and other types of development shall not be permitted to significantly draw on this capacity. [R-p4a]

100. Restrain Expansion of Coastal Road Capacity. The construction or expansion of coastal roads shall be given second priority to development of public transportation and shall be allowed only where: [T-p3] (1) the project would not open coastal rural areas for development or would not allow for increased development except in accord with Coastal Plan land-use policies; [T-p3c] (2) existing roads are carrying traffic volumes in excess of their assigned service volumes (capacity) and no alternate route is available or means of transportation is feasible; [T-p3d] (3) the project is necessary to provide public access to an important coastal resource and other means of meeting this goal (e.g. public transit, diverting non-coastal traffic) have been found to be infeasible; [T-p3a] or (4) the project is absolutely necessary for traffic safety and no other safety measures are possible. [T-p3b] (See also Policy 43 regarding restriction of freeway construction in critical air areas.)

101. Develop Alternatives to Excessive Use of Coastal Routes. Except where greater adverse environmental impact would occur, major transportation routes and public transportation systems shall be located sufficiently far inland

to protect the scenic quality of the coastal road system [A-p14b] and to reserve Highway 1 primarily for recreational use. [R-p4c] Inland and lateral routes should be improved and properly signposted to attract non-recreational through traffic away from coastal areas, consistent with the State Department of Transportation planning concept, now recently expired, which states, "Traffic which is not specifically oriented toward use of the coastal zone will be encouraged to use other nearby traffic corridors." [T-p5] Coordinated bus services, bus tours, bus lanes, carpooling, and segregation of heavy vehicles from regular coastal traffic shall also be encouraged to reduce excessive traffic loads, as well as to reduce air pollution along coastal roads. [T-p12]

Regional Amplification

North Central: The improvement of lateral connecting links shall be considered as one means of providing coastal access without changing the design qualities of the coastal road system. Because portions of Highway 1 in Marin and Sonoma Counties are presently not adequate for good bus service and are difficult and expensive to improve, existing east-west roads between Highway 101 and the coast should be utilized and improved to the minimum extent necessary for bus transit serving the coast. [T-p3RA]

102. Maximize Recreational and Scenic Value of Highway 1 and Coastal Roads.

The recreational use of coastal Highway 1 and other coastal roads shall be maximized and their value as scenic roads, especially along the rural coastline, shall be protected. [R-p4] New and existing roads along the coastline with expansive views of the coastal waters shall be regarded as scenic routes.

[A-pl4a] Toward this end:

- a. Establish a Coastal Scenic Parkway Program. A Coastal Scenic Parkway Program should be established in conjunction with the State Scenic Highway Program, as provided for in State law. State Highway 1 and all eligible State highways and county roads within the coastal zone should be designated as part of the Scenic Highway Program, and, where applicable,

the Scenic Parkway Program should be instituted. Particular emphasis should be placed on protecting the highway corridor in scenic areas. [T-p9]

- b. Use Shoreline Land Acquisition Law. The State law which gives the State Highway Commission the authority to acquire shoreline property, between the mean high tide line of the ocean (including bays and estuaries) and a State highway up to 300 feet, should be vigorously utilized where appropriate. This law should be amended to enable the acquisition of all the area between the highway and the mean high tide line. [T-p9]
- c. Provide Roadside Recreational Amenities. Funding should be provided for additional roadside parks, information centers, vista points, and rest stops, including picnic grounds, drinking water, and rest rooms. [T-p9 and from R-p4b] Parking shall be on the inland side of the road wherever safety permits, with safe pedestrian access provided to the coastline wherever possible. [A-p14a] To protect the visual experience of traveling along coastal roads, as adequate off-road parking and roadside view areas are provided, parking shall be prohibited along the seaward shoulder. [R-p4b] Provisions shall be made where feasible along all such scenic routes for pedestrians, equestrians, and bicyclists. [A-p14a]
- d. Design Standards for Scenic Coastal Roads. New and existing scenic routes, including roadways along the coastline with expansive views of the ocean, shall be designed, constructed, and maintained with the highest regard for aesthetic considerations. Bridges, overpasses, parking areas, guardrails, and other such transportation and roadside facilities shall be integrated into the natural landscape so as to complement and enhance the surrounding area, and to retain scenic views and vistas. [A-p14a] These facilities shall be harmonious with the scale and character of the existing road and/or any improvements suggested in other Coastal Plan policies. [T-p9] Small-scale elements such as lighting fixtures,

directional signs, street furniture, and landscaping materials shall be designed to visually identify coastal roads and to help orient coastal viewers. [A-p14a]

- e. Regulate Development Along Scenic Routes. Viewshed and roadside controls shall be required to protect the scenic qualities of roadway scenic corridors. [from T-p9RA] (See also Appearance and Design chapter.)
- f. Promote Coastal Highway Tour Bus Service. To reduce automobile traffic on Parkways and scenic routes, attractive tour bus service, on the model of the European tour bus system, should be vigorously promoted. [T-p9] (See Policies 107-111 regarding public transit.)
- g. Provide Public Information on Scenic Routes. Information on the scenic corridors shall be made available to the Automobile Club, bicycle clubs, YMCA, YWCA, tourist organizations, etc. [A-p14RA]

Regional Amplifications

Central Coast: Route 1 between Carmel River and San Simeon, and between Half Moon Bay and Santa Cruz, should be kept a scenic two-lane highway. Through legislative action, these segments of Highway 1 should be designated as the Big Sur and Portola State Parkways respectively, and would link many other existing and planned State park units. These portions of Route 1, as well as the Devil's Slide area between Pacifica and Montara, should be viewed as linear parks. [R-p4RA]

South Coast: A coastal scenic route shall be established, to include special signs, markers, rest stops, and vista points equipped with informational signs identifying landforms and landmarks in the view. Some information centers shall be established.

The scenic route should be continuous, uninterrupted, and cover the entire South Coast Region. The alignment chosen should maximize the view of the ocean, flora and fauna, coastal geology, physiography as well as the social ecology, activity settings and extractive uses of the coastal land. The alignment should include unique scenic areas, vista points, and panoramic view areas.

Wherever possible the same scenic corridor should include pedestrian paths, bikeways, and navigation routes for small boats. [A-p14RA]

San Diego: In addition to scenic highways which are currently designated or proposed in San Diego County, old Highway 101 between Oceanside and Mission Bay should be so designated. [T-p9RA]

103. Restrict Road Access to Sensitive Areas. Environmentally sensitive areas shall be served only by roads of rural character, trails, or boardwalks if appropriate. In some areas, no access may be desirable. Decisions on road improvements and capacity increases in these areas must be based primarily on the suitability of the area to increased access rather than on the desire of users for more convenient access. [T-p8] Where information is available to determine the environmental carrying capacity of a coastal resource (see Policy 86), the designed capacity of roads, parking areas, and other support facilities shall be kept within the environmental carrying capacity of the natural resource. [R-p5d] Where use limits are required, and where increased automobile traffic cannot be accommodated without adverse consequences, public transit or trails should be the exclusive means of access. [T-p8]

104. Regulate Road Construction to Minimize or Eliminate Impacts. Road construction shall be permitted only if adverse environmental, social, and economic impacts have been eliminated or minimized. [T-p7] Sandy beaches and environmentally sensitive areas, including but not limited to coastal water or wetland areas or estuaries shall not be significantly disturbed or displaced. [T-p7a] Significant historic or archaeological sites shall be protected. [T-p7c] Significant manmade assets of coastal communities shall not be significantly disturbed or displaced. [T-p7d] Mitigation measures for all other impacts shall be employed in planning, design, and construction of new or expanded roadways, [T-p7e] including minimizing interference with natural drainage patterns, [T-p7b] and the need for cutting, filling, and grading for roadway construction, in accordance with Policy 57. [from A-p9]

PARKING

FINDINGS

Adverse Impacts of Parking Facilities. The demand for parking facilities is high along the coastline, but additional parking facilities would generally have negative environmental impacts and consume scarce coastal land. Encouraging automobile traffic as a form of local transportation may be detrimental to the overall quality of the coastal zone environment, causing air and noise pollution and the loss of visual and environmental amenities. Where parking is inadequate, however, cars spill over into surrounding streets and neighborhoods, or onto the shoulders of highways, causing congestion and impeding public access to the shoreline. [T-f8]

Shuttle Systems to Reduce Shoreline Parking Needs. Shuttle systems, by acting as collectors from remote parking areas or transit transfer points, can greatly reduce the need for parking along the immediate shoreline. Shuttles can also be used to provide exclusive transit access to areas that are environmentally fragile or overused. Care must be exercised, however, for it would be possible for the remote parking reservoirs themselves to have detrimental environmental impacts. [T-f8]

POLICIES

105. Minimize Impact of Parking Facilities. The adverse impact of parking facilities upon coastal visual resources shall be minimized while allowing for increased public access for the enjoyment of these resources. [A-p14]

- a. Use Shuttle From Remote Parking Areas If Possible. New shoreline parking facilities shall be allowed only if it can be demonstrated that shuttle bus service or other transit alternatives from remote parking areas is not a practical means of meeting the public access requirements. Shuttle bus service from remote parking areas should be instituted at peak periods, along with encouraging the use of existing but underutilized parking facilities. [T-p11]
- b. Design Standards for Parking Facilities. Wherever possible, parking facilities shall not be located on the seaward side of the coastal road. Where appropriate, parking shall be consolidated for joint use by surrounding businesses and neighbors, and shall be below grade or underground, or in multi-story structures to prevent large, obtrusive lots,

and shall be attractively designed and buffered with landscaping, berms, or other attractive screening materials. Where improved on-grade parking lots are permitted, in addition to similar berms or buffers, they should generally have trees planted throughout the lots. [A-p14c]

106. New Development Must Fully Meet Parking Needs. New, intensified, or expanded public or private coastal development shall be permitted only if:

(1) adequate parking facilities are provided to meet the demand generated by the development [T-p10] (in residential projects, one parking space per studio unit, 1-1/2 spaces per one-bedroom unit, two spaces per unit of two or more bedrooms, and one space per hotel or motel unit, may normally be regarded as minimum requirements, though a higher standard may be required in areas with serious on-street parking problems) [A-p14RA]; or (2) access by public transportation replaces the need for private vehicles and parking spaces to accommodate them. [T-p10]

PUBLIC TRANSIT

FINDINGS

More Coastal Transit Is Needed. Transit systems are presently used very little to gain access to and through the coastal zone, especially for recreational trips. Coastal transit systems could help reduce congestion and pollution and help provide coastal access to those without cars and those who wish to avoid the problems of traffic congestion and limited parking, though some improvement in roads may be necessary to accommodate improved bus service. Ninety per cent of the public demand for recreation is generated within two hours driving time of metropolitan areas, therefore this is where there is the greatest need for public transportation. Existing bus systems could provide service in metropolitan coastal regions through weekend use of idle vehicles. Present service is currently limited and/or inadequate in most coastal areas. [T-f10]

Rail Passenger Service on Coast Is Increasing. Railroad passenger service to and along the coast, now provided almost exclusively by Amtrak, was on a steady decline from the 1920s and 30s but has been increasing since 1971 along with the public's desire for effective mass transit. New coastal passenger railroad service is being proposed but limited funding is available. [T-f13]

Problems of Coastal Transit Travel. Problems of transit travel on the coast, including recreational travel, include: (1) inconvenience due to time re-

quirements for home to destination trip, frequency of transit service, inflexible schedules, difficulties in traveling with children and the use of vehicles not equipped to carry recreational equipment; (2) high farebox charges, especially for groups and families; and (3) lack of personal mobility at the destination. While it is clear that transit operations cannot always substitute for coastal automobile travel, transit improvements—e.g., improved capability for handling recreational gear and expanded schedules—could increase transit use. [T-f11]

Need For Funds For Transit Operations. Mass transit generally cannot pay for itself with fares alone. Although it has long been established practice for government to encourage automobile travel systems through highway construction, government support for mass transit has been limited. While transit's major financial need is for operating costs, State and Federal subsidies provide primarily for planning and capital expenditures. Labor costs constitute the major portion of costs for bus transit, and the problem is compounded by the need for weekend service when labor costs are higher. [T-f7]

Possible Sources of New Funds. New sources of funds could include placing responsibility on major traffic generators (e.g., by requiring contributions to transit service), assumption of some costs by other agencies that have jurisdiction in coastal areas (e.g., park and recreation agencies), or subsidizing transit through charges on automobile travel (e.g., gasoline taxes, license fees, parking taxes). [T-f7]

POLICIES

107. Provide New Funding for Coastal Zone Transit. New sources of funding for the necessary expansion of public transit in the coastal zone should be provided, with emphasis on subsidies for extensions or upgrading of such service and providing operating costs and increased user conveniences (e.g., bus shelters). High priority in the allocation of transit funds by transportation agencies should also be given to: (1) feasibility studies for alternative transportation systems in the coastal zone; (2) seed money for the establishment of new transportation services to serve the coastal zone; and (3) demonstration projects for new service, with emphasis on innovative approaches that will maximize access while protecting coastal resources. [T-p14]

108. Establish Priority of Transit Over Roads for Cars. Public transit should be given priority over new or expanded roads for automobiles, particularly:

- (1) where public transit is most economically feasible, due to high population

concentrations and concentrated recreational uses, and/or where existing transit districts or facilities could expand weekend service; (2) where present highway or parking facilities are congested and public transit could provide additional access without the adverse effects of new roads and parking; (3) to provide exclusive access to fragile coastal areas, in order to limit the amount of use; (4) to link all coastal communities currently lacking such connections, especially northern California coastal communities with the San Francisco Bay Area; (5) where existing rail right-of-way or service could be improved to provide increased access to and along the coast; [T-p12] or (6) where critical air pollution levels either exist or are projected. [T-p13]

109. Expand Transit in Urban and Critical Air Areas. Public transportation in urban areas and in critical air areas should be developed, improved, and expanded in order to lessen dependence on the automobile for access to the coastline and in order to reduce air pollution levels. [R-p3 and from T-p13] Toward this end:

- a. Provide Remote Parking with Shuttle Service to Coast. Public transportation to coastal beaches should be provided from existing centralized parking lots when available, such as at schools, shopping centers, drive-in theaters, or offices during peak recreational use periods. Public transit authorities should investigate means and scheduling to implement such system. [R-p3a] Where it is physically possible to do so, upland parking facilities should be provided, linked to coastal recreational facilities by trails, shuttle buses, or trams. (See also Policy 81.) [R-p3b]
- b. Improve and Expand Bus Service. Coordinated bus service and tours, bus lanes, dial-a-bus service, jitney service to and from the coast, and intracity shuttle loops should be developed. [from T-p13] Commercial recreation and support facilities should be clustered and multi-use complexes that can be served by public transit facilities. [R-p3c]

- c. Design Bus Service for Recreational Users. Public transportation should include accommodations for the physically handicapped, bicyclists, surfers, divers, and others with bulky or specialized equipment, and weekend schedules should be established with specific stops and pickup points designed to serve recreational users. [R-p3d]
110. Encourage Expanded Rail Service. Amtrak and the rail companies should be encouraged to expand inter-city passenger rail service along most existing rights-of-way in the coastal zone.
- a. Protect Rail Rights-of-Way. An inventory of all existing coastal railroad rights-of-way shall be made and all rights-of-way usable for railroad passenger travel shall be preserved for future rail service. No use should be made of these rights-of-way that would preclude their use for some form of transportation. [T-p16]
- b. Link Rail Service with Other Transit. All passenger rail service should be connected with public transit that provides door-to-destination service.
- c. Regulate New Construction and Service Changes. Modifications of train service, new construction, or alterations in alignment shall be in accordance with the goals and policies of the Coastal Plan. [T-p16]

Regional Amplification

Central Coast: Future options for the reestablishment of coastal railway service to Monterey and Santa Cruz counties should be maintained by protecting existing rail corridors to the nearest Amtrak mainline connections, as well as along the Monterey-Davenport coastline and through the San Lorenzo River canyon. [T-p16RA]

San Diego: Expanded and improved train services could be provided along much of San Diego County's coastline, with relatively small adverse coastal environmental impact. Such passenger rail service should be carefully considered as a part of the regional transportation plan, to serve as a major mode for accommodating future coastal travel demand. Such consideration should also examine the contingency of rail improvements in the event a rapid transit system is not accepted by the voters of the San Diego Region. [T-p16RA]

111. Develop Unified, Comprehensive Transit Schedules. The coastal agency shall work with the variety of public and private companies (e.g., Greyhound, Peerless, Amtrak, local bus lines), which are sometimes in competition with each other, to develop unified, comprehensive, and convenient schedules showing access to the shoreline. These schedules should be distributed in areas where people are likely to use transit facilities to the coast (e.g., San Jose, San Francisco, Salinas) and especially to schools and senior citizens' centers since the young and old are particularly dependent on public transit. [T-p12]

Air Transportation

FINDINGS

Airports Consume Large Amounts of Coastal Land. By their very nature, and especially with new requirements for noise buffer areas, airports consume large amounts of land. Satellite business and industry also can consume large amounts of land, especially at the larger airports. [T-f17a]

Airport Noise Has Severe Impacts. The most severe environmental impact of airports and air travel is their noise impact, particularly on residential and recreational coastal areas. This is most severe in the cases of Los Angeles International Airport and Lindbergh Field in San Diego where there is intense urban development around them. To mitigate this impact, the State Department of Aeronautics has established Community Noise Equivalent Level (CNEL) standards with target dates for their attainment. For new airports, no residences may be located within 65 CNEL contour projected for such airports. On the other hand, airports located on or near the shoreline do offer over-water takeoffs and landings, which reduces noise impacts on the adjacent urban areas. Existing airports must reach the same standard by 1985. [T-f17b]

Airports Generate Surface Traffic Congestion. During peak periods, airport-generated surface traffic congestion can compete with coastal recreational traffic. [T-f17c]

Airports Could Be Located Inland. Considering airports land requirements, the scarcity of coastal land, and the nondependence of airports on coastal locations, there appears to be strong justification for locating airports away from the coast in favor of more coastal-dependent or -related uses. No new coastal airports are now foreseen by airport planning agencies with the possible exception of a site at Pebble Beach on Catalina Island. [T-f17]

POLICIES

112. Policy on Future Airport Siting. Because no new airports are proposed by airport planning agencies in coastline or offshore locations, the Coastal Plan makes no provision for them. If a substantial need for a new airport in a coastal or offshore location should arise in the future, the coastal agency should develop siting criteria in cooperation with the State Department of Transportation addressing the possible adverse impacts airports can have on coastal lands, residents, and other coastal users (e.g., consuming of large amounts of coastal land, noise, generation of airport-related surface traffic) and adopt them, after public hearing, before considering any specific airport siting proposals. [T-p18] (If possible, this will be done prior to adoption of the Final Coastal Plan.)

113. Limit Expansion of Coastal Airports. Landfill and other land expansion of existing coastal airport facilities shall be permitted only if the applicant can demonstrate that (1) there is a need for expansion that cannot be met through more efficient use of existing facilities, or through other transportation systems; and (2) all other means of expanding have been evaluated and are unacceptable because of economic, environmental, and social costs. [T-p18] Where permitted, any such expansion shall be consistent with all other applicable Coastal Plan policies (particularly replacement for filling of wetlands, and minimum impact on agricultural lands, scenic, habitat, and recreational resource areas).

Regional Amplification

San Diego: Because the future of Lindbergh Field and Ream Field is somewhat uncertain, expansions of existing coastal airports in the San Diego Region shall be allowed only as interim measures which would insure their efficient operation, pending the final decision concerning the ultimate location of the San Diego regional airport and the maximum feasible consolidation and elimination of non coastal-dependent military air operations. Any proposed expansions should:

- (1) Not increase the total area encompassed by the airport boundaries;
- (2) Not intensify the adverse environmental impacts which the existing airfields have;
- (3) Increase airport efficiency and accommodate larger quieter aircraft which would reduce the total number of flights;
- (4) Be of such nature that they can be easily amortized over the useful life of the airport.

Further, a continuing planning effort should be undertaken to accommodate the replacement of Lindbergh Field as the regional airport and establishment of the new regional airport at a site less damaging to the coastal environment. [T-p18RA]

114. Provide Public Access in Some Airport Buffer Land. Coastal airports with large amounts of adjacent buffer land that may contain areas suitable for recreation and/or environmental preservation in conjunction with coastal waters (such as Los Angeles Airport, Lindbergh Field, and Santa Barbara Airport at Goleta) should provide public access, where feasible, and recreational amenities, including bike paths, hiking trails, scenic turnouts, and viewpoints. Any public access to natural habitat areas on airport property that is provided shall be consistent with the carrying capacity of such areas. [T-p20]

115. Airport-Related Transportation and Parking. Airport ground transportation and parking facilities serving existing or proposed airports shall not be permitted to lower the level of service or budgeted recreational capacity of surrounding street, highway, or freeway systems that serve the coastline. Further, mass transit systems, regional airline bus terminals, jitney service, and park-and-ride lots shall be encouraged to provide transit alternatives, replacing the need for the private car, and to reduce traffic congestion and vehicle emissions at coastal airports. [T-p19]

Water Transportation

FINDINGS

Economic Importance of Ports. The ports of California are major economic enterprises that serve major import, export, and domestic waterborne commercial needs of California and the nation. Directly and indirectly they provide a significant proportion of the jobs and income of the State. Because of the economic importance of port facilities, necessary port growth and development should proceed, but in a manner that minimizes damage to the coastal environment. [T-f18]

Exclusion of San Francisco Bay from Coastal Zone Planning. The California Coastal Zone Conservation Act of 1972 (Proposition 20) excluded from the jurisdiction of the California Coastal Commission the San Francisco Bay region, one of the State's major port areas (including the ports of San Francisco and Oakland), because this area was already under the jurisdiction of the San Francisco Bay Conservation and Development Commission (BCDC). Statewide port policies would have an impact on the relative competitive positions of all of the State's ports, including the San Francisco Bay ports. The BCDC is presently involved in a regional port planning effort with the Metropolitan Transportation Commission (MTC). Coordination of these efforts with the Coastal Commission planning is necessary to ensure the development of compatible regional port policies. [T-f19]

Competition between Ports Can Result in Overbuilding. The major California ports are public agencies that compete with each other for cargo and business. Such competition can result in overbuilding and underutilization of port terminals, as each port tries to capture the most cargo and to keep pace with changes in shipping technology. Renewal of existing port areas and increased efficiency of port operation could obviate many of the current plans for port expansion. [T-f22]

Unnecessary Port Development Results in Environmental Damage. While the present system has resulted in competitive rates and modern facilities for shippers, it is not able to adequately take into consideration the environmental impacts that may result from unnecessary port development. As explained in detail in the Marine Environment chapter, dredge and fill operations to develop or maintain ports can have significant adverse environmental impact on marine resources. [T-f22]

Analysis Needed to Determine Future Port Development Needs. An updated analysis of future California commodity flows is necessary to adequately assess the need for port development. The Army Corps of Engineers is presently conducting such an analysis for the entire West Coast as well as a more detailed study for the Los Angeles-Long Beach and San Francisco Bay port areas. [T-f21]

Existing Ports Are Underutilized. Although there are no generally agreed upon estimates of the capacity and present degree of utilization of California ports, the existing major port complexes on San Francisco Bay and San Pedro Bay (ports of Los Angeles and Long Beach and Port Hueneme) appear able to handle much more traffic than they do currently. It is estimated that Hum-

boldt Bay's port facilities are used at only 20 to 35 per cent of capacity and that San Diego's port operated at only 37 per cent of its capacity in 1973-74. The Maritime Administration in the U.S. Department of Commerce is now making a two-year study of ways to adequately determine port capacity. [T-f20]

No New General Ports Are Needed. No new general port areas are required in California for the foreseeable future. Present projections of commercial shipping needs (Water Resources Council, 1971) indicate that most general and bulk cargo port requirements for California can be handled at existing port facilities with relatively minor modifications such as renewal (i.e., more intensive use) of port lands and equipment modernization. For example, existing Long Beach facilities, if utilized to their designed capacity, could alone accommodate the projected container flow for both Long Beach and Los Angeles ports to at least 1980 and the projected general cargo flow for both ports through 2020. [T-f21]

Coordinated Planning Could Maximize Ports' Efficiency, Capacity. Distributing commodity flows among a region's ports on the basis of available and planned facilities, and planning port development projects according to projected commodity flows, could maximize the yield from public funds and minimize the need for environmentally destructive port development. [T-f23]

No State Agency Now Coordinates Port Development, Traffic Distribution. Although a voluntary association of ports in California (California Association of Port Authorities) does exist, and although all the major ports are publicly owned, there is no public agency to coordinate or plan for development or traffic distribution between ports, even for ports within the same bay or harbor. Currently, the BCDC in conjunction with MFC is involved in a regional ports planning effort for the San Francisco Bay Area. Though the California Department of Transportation is required by its enabling legislation to prepare a California Transportation Plan (for submission to the Legislature by January 1, 1976) that will include regional maritime transport elements, the Department states that its role in regard to State and regional port planning is still being explored. [T-f23]

New Cargo Handling Technology. New methods of handling cargo may reduce some of the need for port expansion. Lighter-Aboard-Ship-Handling (LASH) vessels were specifically designed to on and off load barges near ports lacking sufficient draft to accommodate deep draft vessels and to permit unloading at congested ports. Use of these vessels would effectively eliminate the need for extensive dredging in some California harbors, but they are not yet being used as efficiently or economically as they were intended. The use of currently available (though expensive) high-speed vertical stacking equipment could also reduce the need for port expansion: acreage requirements for storing standardized containers can be reduced from more than 35 acres per berth to less than 8 acres per berth. [T-f24]

Rail Use at Ports. An efficient land transportation system is a major consideration in port design and operation. Studies being done by the California Department of Transportation and regional planning bodies will deal with the land transportation requirements of existing ports. Rail transportation, while less flexible than truck, generally requires less land, generates much less air pollution and uses less fuel. However, trucks are required for short haul situations in the immediate market area of the port. [T-f25]

Lack of Coastal Water Passenger Service. The highest coastal population concentrations in California are located around the San Francisco Bay area and from Los Angeles southward to the Mexican border. Despite these high population concentrations the only existing water passenger service is from Long Beach to Catalina Island and from San Francisco to Sausalito and Tiburon. [T-f26]

POLICIES

116. No Additional Major Port Areas Required. No new port areas shall be developed outside existing port cities except for possible specialized facilities such as petroleum or liquefied natural gas tanker terminals. [T-p21]

117. Maximize Use of Existing Ports. To make maximum use of existing ports, a Port Master Plan shall be prepared, taking into account potential traffic conflicts between oil tankers or LNG carriers and other vessels [T-p22d] and giving the highest priority in the use of existing land space within harbors to port purposes, such as navigational facilities, ship-berthing and materials-handling facilities, shipping industries, and necessary support and access facilities. Other uses consistent with the public trust and otherwise beneficial, such as recreation and wildlife habitat, shall also be provided. [T-p22e]

Rail service to port areas shall be encouraged. [T-p24]

Regional Amplification

South Coast: Bay-wide economic and port facilities studies shall be conducted on a continuing basis for San Pedro Bay, taking into account regional, national, and international economic factors as well as social and environmental impacts. Such studies shall guide future expansion and renewal programs. Public information programs shall be expanded to encourage public participation in port planning.

Los Angeles and Long Beach Harbors shall produce and maintain coordinated general plans to guide future development, particularly at the physical interface of the two ports. Major port activities, recreational boating, sport fishing, research and development, possible merger, passenger use, public access, and logistical support of maritime activity shall be considered in the plans. Emphasis shall be placed on environmental protection.

Scenic access, bicycle routes, and ferry service in the South Coast areas shall be developed for recreational purposes as part of the general plans of the ports, consistent with public safety and non-interference with cargo activities. Recreational water travel along the entire South Coast Region shall be encouraged. [T-p22RA]

Criteria for Approval of Port Development Involving Filling or Dredging.

No new major port development or expansion projects involving filling or dredging shall be allowed unless it can be demonstrated that there is a clear need for the amount and type of cargo proposed to be handled by the new development and that all regional terminal facilities capable of accommodating the projected commodity flow will be utilized to their maximum practical capacity. Where available, or where required by the coastal agency prior to approval, regional commodity flow studies, such as those presently being conducted by the Army Corps of Engineers, to be reviewed and accepted by the coastal agency, shall clearly indicate the need for such development, and a detailed examination of berth occupancy, port tonnage, and other relevant port performance indices, including those presently being developed by the U.S. Maritime Administration, shall indicate that the proposed development is needed to accommodate amounts and types of cargo for which there are no existing and available terminal facilities. [T-p22a,b,c] In addition, a Port Master Plan must be completed and a final environmental impact report of the Port Master Plan carried out as prescribed by the California Environmental Quality Act. [T-p22e] This policy does not apply to minor in-harbor dredging, which shall be allowed in existing ports to maintain existing or previously constructed water depth, in accordance with other Coastal Plan policies on dredging and spoils disposal. [E-p29] (This policy is consistent with port development requirements in San Francisco Bay as applied by the San Francisco Bay Conservation and Development Commission.) [T-p22]

119. Minimize Environmental Impacts of Port Projects. Where permitted, port development and expansion activities shall minimize the direct and significant environmental impact of diking, dredging, filling, and preemption of land and water. [T-p22]

- a. Use Least Destructive Methods. Where permitted, port expansion or development projects and port renewal or maintenance projects (such as pier modifications, maintenance dredging, handling or storage facilities renewal) shall be required to incorporate the least environmentally destructive methods available. Dredging and spoils disposal operations shall conform to the policies set forth in the Marine Environment chapter of the Coastal Plan. [T-p23]
- b. Utilize Available Port Land. Wherever feasible, the backup land area required shall be minimized and existing areas more intensively used through the use of improved equipment and handling methods such as vertical stacking of containers and more efficient vessel scheduling. [T-p23]

120. Study Feasibility of Expanded Coastal Ferry Service. An in-depth study should be conducted as part of the State Transportation Plan to determine the feasibility of implementing inter-and intra-regional recreational and commuter ferry service along the coast. All existing ferry service should be vigorously promoted and expanded. [T-p25]

Energy and the Coast

FINDINGS

California Coastal Zone Can Potentially Contribute to the State's Energy Supply in Several Ways. The land and water of the California Coastal Zone can potentially be used to contribute to the State's energy supply in five principal ways: (1) to provide sites and ocean cooling water for power plants that generate electricity; (2) to provide oil drilling, production, and handling sites for recovering petroleum from submerged lands beneath State and Federal offshore waters; (3) to provide terminals to moor and offload tankers and barges bringing crude oil and refined products to California, the region, and the nation; (4) to provide sites for oil refineries; and (5) to provide special terminals and onshore plant facilities for liquefied natural gas imports. [E-f1]

Coastal Plan Will Protect the Coast Yet Provide for Needed Energy. A principal goal of the Coastal Plan is to protect, enhance, and restore the coastal environment while still planning for those energy facilities for which a clear public need and a need for siting along the coast can be shown. Coastal planning must not sacrifice the environment of the rest of California; little would be gained if a coastal area were to be saved at the price of even greater environmental damage inland. Energy planning for the coastal zone must take into account (1) estimates of energy needs, (2) strategies for reducing the need for coastal energy development through energy conservation programs and application of alternative energy forms, (3) the environmental impacts of locating energy facilities in the coastal zone and inland, and (4) the effect of new energy legislation in California. [E-f2]

Present and Potential Demand and Supply Forecasts for Primary Conventional Energy Sources. Primary conventional energy sources used in California are petroleum (crude oil), natural gas, hydropower, and nuclear. Based on present demand/supply forecasts (using traditional forecast methodology) demand for these primary sources will exceed supply. Specific considerations follow concerning: (1) demand/supply characteristics of each primary source; (2) the planning implications of conventional demand/supply forecasts; (3) prospects for potential demand growth reduction; and (4) the need for revised methodologies that give proper consideration to changing economic, environmental, and technological conditions.

PETROLEUM SUPPLY AND DEMAND

Petroleum Demand Exceeds Supply. California petroleum demand at present outstrips in-State production, and the deficit is likely to increase. [E-f5]

New Sources Needed to Meet Even a Reduced Demand Growth. To meet even a reduced demand growth for petroleum, new sources of supply will be needed. Supply requirements can be met by: (1) increased development of the in-State onshore resource, including increased exploration and expanded secondary and tertiary recovery; (2) development of the State and Federal offshore petroleum resources; and (3) foreign and Alaskan imports. Increased onshore production offers the least environmental risk, but has a limited potential for increasing supplies. New sources could require major new developments in the coastal zone which could have substantial adverse environmental impacts. [E-f5]

California's Role in National Petroleum Supply Needs Updating. At present, California's only defined role in national energy supply is based on its historical and continuing role within Petroleum Administration for Defense District V (PAD V—California, Arizona, Nevada, Oregon, Washington, Alaska, and Hawaii). [E-f5]

California Is Heavily Oil-Dependent. Oil now accounts for over 50 per cent of California demand for primary energy. The major oil requirements are for energy (electricity generation, agricultural and municipal water pumping, industrial process heating, vehicle fuels, liquid petroleum gas) and production of oil-derivative products. [E-f6]

Present Oil Demand Growth Projections Foresee Increased Demand Levels. Leading studies on oil demand growth for California completed in early 1973 forecast high oil demand growth due to: (1) a continued decrease in the availability of natural gas; (2) failure of nuclear plants to come on line as scheduled; and (3) a continuation of pre-1973 gasoline consumption growth.

However, such projections did not consider the significant potential for demand reduction from (1) increased oil prices, (2) conservation measures, and (3) development of alternative energy sources, among other factors that are expected to lead to reduced demand growth rates and consumption levels and consequently to reexamination of traditional forecast assumptions and methodology. [E-f7]

Oil Price Increase May Reduce Demand. Since late 1973, foreign oil prices have risen abruptly by as much as 100 to 300 per cent, in turn forcing price increases in domestic oil and petroleum products. Such oil price increases may not only precipitate a change in oil demand but also stimulate shifts to alternative energy sources and more efforts for conservation measures. A major effect of the price surge is to throw into question all public projections of demand and supply of petroleum that pre-date the increase. [E-f8]

Conservation Programs May Lower Demand. Both the Federal Energy Administration and the new California State Energy Resources Conservation and Development Commission are specifically charged with developing conservation programs to help conserve oil. The Coastal Commission has a general mandate to conserve and manage coastal resources, including both energy resources and other coastal resources that would be affected by energy-related development. Most existing petroleum demand forecasts do not reflect adequate consideration of the potential for demand reduction through such programs. [E-f9]

Alternative Energy Sources and Other Factors May Help Reduce Oil Demand Growth Rate. Factors besides price increases and conservation programs that may help reduce the oil demand growth rate include: (1) an increased availability of natural and synthetic gas, methanol, and alternative energy sources to replace reliance on petroleum (especially for electrical power generation); (2) strict

government allocation of available supplies of petroleum products; (3) changes in lifestyle, particularly in reduced use of the private automobile and of electricity; (4) a continued decline in the State population growth; and (5) a more modest growth rate in the national economy. [E-f10]

State's Crude Oil Production Fails to Meet Demand. California crude oil production has steadily declined since 1968-69 from about 1,000,000 barrels per day in 1968 to about 850,000 barrels per day in 1972. In 1973, only 55 per cent of the crude oil for California refineries came from within the State; 31 per cent came from foreign sources and 14 per cent came from other states. Projections for 1975 indicate that California will furnish only 49 per cent of its own crude oil for refineries, with 41 per cent coming from foreign countries and 10 per cent from other states. If demand/supply trends of the recent past should continue, the portion of State demand satisfied by State crude production would drop markedly by 1985. However, because of possible demand reduction factors considered above and the potential for increased development of California's potential recoverable onshore and offshore oil resources, a huge in-State deficit is by no means inevitable. [E-f11]

Alaska Crude Oil Will Reduce Need for State Production and Foreign Imports. Much of California's future crude oil supply is expected to come from the Alaska North Slope via pipeline and tanker, beginning as early as 1978. Although the Stanford Research Institute forecast in mid-1973 that oil from this source would amount to 600,000 barrels per day in 1980, and 850,000 barrels in 1985, more recent information indicates that California could, if necessary, receive as much as 1.2 million barrels per day beginning as early as 1978. In addition, very substantial additional petroleum resources are thought to exist in other parts of Alaska where exploration is in very preliminary stages. Unless such oil is required to serve needs beyond the State and region, the availability of these oil supplies could substantially reduce or eliminate the need for increased exploration and production offshore of California and the need for imported foreign crude. [E-f13]

State Demand for Low-Sulfur Fuel Oil Exceeds Present Supply. As natural gas supplies have recently been curtailed, the short-term demand for fuel oil for use in industry and in electric power generation has increased. State air quality regulations require the use of low-sulfur oil when natural gas is not available. Much of California's crude oil is high in sulfur content; and although several new projects are planned, California refineries presently lack adequate direct desulfurization capacity to meet low-sulfur crude oil demands. Therefore these demands must be met either by import of low-sulfur crude for refining in California, or by import of refined low-sulfur fuel oil. [E-f14]

State Petroleum Planning Needs Better Coordination with Energy Planning. At present no State Agency is responsible for planning petroleum related development activities within the context of a comprehensive program of energy development and conservation in California. The State Division of Oil and Gas forecasts petroleum supply and demand and drafts policies for petroleum development, but it does not directly determine policy for other sources of energy. The State Lands Commission makes decisions relating to development of the petroleum resource underlying State-owned lands. The new State Energy Commission will determine policy for power plant siting and energy conservation and will study petroleum supply and demand and recommend development and conservation policy, but it will not determine policy for siting petroleum-related development. [E-f15]

NATURAL GAS SUPPLY AND DEMAND

Natural Gas Demand Exceeds Supply. Natural gas is a desirable fuel because it is relatively clean burning. Its extraction and transportation, however, involve many impacts similar to those associated with oil. The demand and supply of natural gas is important to coastal planning because it will help determine the need for: (1) liquefied natural gas (LNG) facilities in California, (2) facilities proposed by electric utilities and oil companies to provide additional low-sulfur fuel oil to substitute for natural gas in power plants and other industries, and (3) production of natural gas associated with oil reservoirs in California's outer continental shelf. In California, as in the rest of the U.S., the demand for natural gas continues to increase rapidly while traditional sources of supply are dwindling. At the present projected growth rates, without additional supplies some curtailment in peak service to residential and commercial customers could occur as early as 1978 in southern California. [E-f16]

Conservation Programs, Price Increases, Other Factors Influence Future Demand. Future demand for natural gas will be influenced by the impact of energy conservation programs and price increases. Price elasticity studies suggest that increases in price may decrease demand for natural gas through conservation and customer switching to alternative forms of energy. On the other hand, although broad energy conservation programs will presumably result in more efficient use of existing gas supplies, they may also stimulate additional gas demand in the residential and commercial sectors, where direct use of natural gas is more energy efficient than use of electricity. Moreover, price increases of other energy sources may also increase customer switching to gas. For these reasons it is difficult to firmly estimate future demand. [E-f17]

Present Natural Gas Supply Sources Cannot Meet Demand. California produces less than one-fourth of its natural gas needs. Moreover, California's total proved reserves of natural gas have been declining since 1963; if present State production and demand trends continue, only 17 per cent of demand will be met by the State reserves by 1985. In 1973, California imported 78 per cent of its gas supply—61 per cent from the southwestern states and 17 per cent from western Canada. However, both the El Paso Natural Gas Company and the Transwestern Pipeline Company have been allowed by the Federal Power Commission (FPC) to curtail their deliveries of gas to California, and further curtailment can be expected in the near term. Additionally, the Canadian National Energy Board has recently refused to permit expanded deliveries of natural gas to the U.S. from Alberta, pending evaluation of the adequacy of reserves to meet Canada's own projected needs. [E-f18]

New Domestic Sources Will Increase State Supply. Potential new domestic natural gas sources include: (1) large reserves of natural gas on the outer continental shelf; (2) large natural gas reserves associated with Alaskan oil deposits; (3) significant quantities of gas trapped in tight rock formations in the Rocky Mountains; and (4) two synthetic natural gas-from-coal (SNG) plants proposed in northwestern New Mexico using coal strip-mined in Utah. California may receive as much as 2/3 of the SNG output of these plants via pipeline beginning as early as 1978-79. Other potential sources capable of incrementally supplementing natural gas supplies are methane gas, produced from sewage, sanitary landfills, or individual units; and SNG from oil (naphtha) production of which is being considered at a proposed refinery near Carlsbad. [E-f19]

Alaskan and Foreign Natural Gas Imported as Liquefied Natural Gas (LNG).

Where pipelines for long-distance transportation of natural gas do not exist, natural gas is being transported in ships in very cold (about -260° F.) liquid form, which reduces its volume by a factor of more than 600. Projects have been proposed to import liquefied natural gas (LNG) into California from practically every major oil-producing area in the world. Import of LNG into California from Alaska and abroad will require LNG port, storage, and gasification facilities, all of which will be located in the coastal zone and involve significant environmental and safety risks. The exact magnitude of LNG imports is difficult to estimate at this time. [E-f20]

Potential of New Natural Gas Supplies Is Substantial. Substantially more gas may be available by the early 1980s than is presently being planned on by the gas utilities. Several studies conclude that even without extensive new conservation measures, if regulatory and pricing policies were altered to encourage development of sources, sufficient gas could be available by the mid-1980s to meet nearly all of the presently projected national gas demand. It is conceivable that a modest resurgence of gas consumption by large industrial and utility users would then be possible. [E-f21]

Less Natural Gas Available to Fuel Power Plants. Power plants, classified as low-priority users of natural gas, substitute fuel oil for gas when gas supply is interrupted. In recent years electric utilities could count on natural gas for up to 90 per cent of their fuel needs, but in 1974 only about 15 per cent of fuel needs will be met by gas. If present consumption trends continue, and if no new natural gas should become available, utilities might have to depend on fuel oil for as much as 90 per cent of their needs by 1976. [E-f22]

ELECTRICITY SUPPLY AND DEMAND

Electricity Demand Determines Need for Development of New Supply. The need for electricity will determine the need for various means of supplying electricity, many of which will directly affect the coastal zone. In 1973, 59 per cent of California's electricity generation was by burning fossil fuels (oil 30 per cent, gas 29 per cent); 31 per cent was produced by hydroelectric sources; and 10 per cent by other sources such as nuclear, coal, and geothermal. Most of California's fossil fuel and nuclear power plants are located in the coastal zone, and utilities are considering new or expanded power plants at coastal sites. Such power plants have many environmental, safety, and land use impacts. (See section on power plant siting.) [E-f23]

Electricity Demand Is Growing. Electrical energy demand is growing both absolutely and as a share of the total energy market as a result of (1) its universal applicability, (2) increasing supply pressures on oil and natural gas, and (3) development of new uses, products, and processes. [E-f24]

Potential for Reduction in Electricity Demand Growth. The growth in demand for electricity in California has averaged 7.7 per cent over the last 25 years. It has now begun to slow, but there is considerable potential for further demand growth reduction through vigorous energy conservation measures, the impact of rising electricity prices and price rate restructuring, and the development of alternative energy sources. Slowed population and economic growth rates in California will also contribute independently to a lower electricity demand growth. [E-f24]

Electrical Energy Use Varies Among Market Sectors. The principal electrical energy market sectors in California are: residential (29 per cent); commercial (38 per cent); industrial (28 per cent); others, including pumping of agricultural and municipal water (5 per cent). The commercial sector is both the largest and fastest growing. [E-f25]

Residential Consumption. Over half the electricity consumption in the residential sector is due to three types of uses: space conditioning (heating and cooling), water heating, and refrigeration, with space conditioning growing fastest. Demand in the residential sector as a whole has increased for several reasons: (1) the number of new households has grown faster than population; (2) the use of air conditioners has increased; (3) until recently utilities actively promoted all electric homes; and (4) many new and sometimes less efficient appliances have been introduced and have approached market saturation. Due to stabilization in the growth rate of new households and the approaching market saturation of many appliances, however, residential demand growth has been forecast to decline significantly, even without price rises and conservation measures. [E-f26]

Commercial Consumption. In the commercial sector, electricity is used primarily for air conditioning, food and products refrigeration, and lighting. Increased commercial electricity use has been forecast to continue, but the sector's sensitivity to electricity price increases and other market factors may help restrain growth. [E-f27]

Industrial Consumption. Industrial electricity demand growth has been due to (1) increased industrial output and floor space, (2) greater electricity use per unit of output, and (3) increased use of electricity instead of primary fuels in industrial processes. The rate of growth has been forecast to slow in the future because of conservation practices. [E-f28]

Consumption Patterns Vary By Region. Electrical energy usage patterns differ regionally within California. Southern California consumes 2/3 of statewide electrical energy produced and has a faster growth rate than the North. Both North and South, however, have recently been experiencing declining growth rates in population and overall electrical energy use. Due to the variations in weather conditions, there are also regional differences in the months of maximum electrical energy usage. Pacific Gas and Electric system peak occurs in July, whereas the San Diego Gas and Electric system peak occurs in December. California's maximum monthly electrical energy usage is usually during August. [E-f25]

Present Demand Projections Based Primarily on Past Growth Factors, Inadequate for Planning. Present demand/supply forecasts provide a questionable basis for planning because they are based on traditional forecast methodology, which give inadequate consideration to changes that can affect demand, such as (1) rising fuel prices, (2) rate restructuring, (3) the potential for alternative energy sources, and (4) energy conservation measures. Recent studies indicate that there will be significant slowing of demand growth due to price increases for electrical energy. [E-f29]

Restructure Rates to Encourage Efficient Allocation of Energy. In the commercial and industrial sectors, declining block rates (i.e., lower rates for successive increments of electrical energy consumed) promote increased use of electricity. A price structure based in part on "marginal cost pricing" would more accurately reflect the cost to the public of the resources being used for

power generation by establishing prices for electricity partially on the basis of the long-run incremental costs of providing electricity to a particular customer, and not merely on the basis of long-run average costs. "Peak load pricing" would more accurately reflect the costs to the public of adding new generation capacity to meet peak demand, and of using less efficient power plants to meet peak demand, by charging consumers higher prices for electricity consumed during designated periods of peak load. The California Public Utilities Commission has recently undertaken an experimental program to investigate rate restructuring, and the State Energy Commission will also have the authority to study this issue. [E-f30]

Long-Term Demand Reduction Through Increased Prices and Conservation Measures. In the long-term, increased prices, intensive conservation efforts, new energy systems, and revised price structures could probably reduce California's estimated demand by as much as 30 to 40 per cent of the conventional projections for the year 2000. [E-f31]

State Energy Commission Will Improve Forecast Methodology. The Warren-Alquist Act (AB 1575) provides for the State Energy Commission to make improved electricity demand forecasts to serve as the basis for electrical generation facility siting. The Energy Commission will develop a standard forecasting methodology to be employed by the utilities in providing input to an independent forecast to be developed by the Commission. [E-f32]

Conventional Demand/Supply Projections Are Pessimistic About Alternative Energy Sources. Many conventional demand/supply projections assume that there will be no significant contributions from alternative energy sources and no major breakthroughs in energy technology that will have a significant impact on electricity supply in this century. Among electric utilities and State agencies such as the Resources Agency and the Public Utilities Commission, there is a consensus that over half of all new capacity in California required to meet electricity demand in the year 2000 will be obtained by nuclear fission power plants, one tenth from hydroelectric power, and only one tenth from geothermal power. No potential contribution is identified from solar, wind, or solid wastes. If these sources appear at all in conventional forecasts, they are typically allocated only token supply contributions or are dismissed as "futuristic." Stronger, more forceful research and development programs at the State and Federal levels, however, could expedite development of the full potential of alternative energy sources for use in California. [E-f33]

Serious Environmental Impacts Implied in Continued Dependence on Conventional Supply Mix Forecasts. The consequences implied in conventional supply mix forecasts are serious: (1) increasingly severe environmental disruptions for fossil fuel extraction, processing, and delivery; (2) consumption for electrical generation purposes of nonrenewable hydrocarbons that are more valuable for other uses; (3) increased problems of air pollution; (4) problems of nuclear fuel transport security, radioactive waste handling and disposal, and potential nuclear reactor hazards, which do not yet have definitive solutions; (5) and problems of cooling water supply and marine life impacts. Such energy planning as has been done in California has been based primarily on the conventional utility projection of electricity supply mix. [E-f36]

Alternative Energy Sources Look Increasingly Desirable and Feasible. Energy sources for electricity generation that previously were thought to be economically unattractive or technologically unattainable have recently become more desirable or more feasible because of (1) escalating price levels for competing

conventional energy sources; (2) new concern for environmental protection, human health and safety, and conservation of nonrenewable hydrocarbon resources; (3) new levels of research commitment for alternative source development; and (4) new concern about political implications of dependence on international markets for energy supply. [E-f37]

Electric Utilities Plan on Basis of Available Technology. Electric utilities take a cautious approach to including alternative sources of electricity generation in supply mix projections because: (1) electric utilities are held responsible for meeting whatever demand for electricity actually exists, and they therefore plan almost exclusively on the basis of available technology as the means to meet 5, 10, and even 20-year demand forecasts; (2) the lead time required for construction of any generating facility is significant: typical lead times are 6 years for a combined cycle fossil fuel plant, and up to 12 years for a nuclear plant. [E-f34]

Electricity Supply Forecasts Form Basis For Other Supply Forecasts. Although the electric utility supply forecasts represent only one possible supply scenario, they are used as a principal basis for planning by a broad range of public agencies dealing with such complex issues as petroleum and natural gas supply, port facilities, land use, and water resources. [E-f35]

Alternative Energy Sources Could Yield Half of New Capacity Required. It is possible that alternative sources of energy that may be environmentally less damaging or less hazardous than the sources shown in most conventional electricity supply projections may make a greater contribution to future electricity supply than is presently acknowledged. A hypothetical alternative scenario for future electrical generation capacity in California suggests that alternative energy sources (solar, geothermal, wastes, wind, and pumped hydroelectric for peak hour demand) for electric power generation might be provided by the following sources by the year 2000:

Solar	16,900 Mw
Geothermal	12,800 Mw
Wastes	3,200 Mw
Wind	3,000 Mw
TOTAL	35,900 Mw

This scenario assumes a strong policy commitment by government bodies and electric utilities to high levels of research and development of alternative energy technologies and to extensive marketing and public education. [E-f38] This capacity would represent half of all new generating capacity required between 1973 and 2000 (based on the Rand study Case "2"—i.e., base case plus price increases). This contrasts with the conventional supply mix forecast of less than 15 per cent from these combined sources. The future share of generation that will actually be provided by each of these technologies is uncertain, and depends on such things as comparative economics, environmental acceptability, and lead time required from earliest date of feasibility. [E-f38]

ENERGY CONSERVATION

FINDINGS

Utility Rate Structures Encourage Consumption. One of the most important and direct ways to encourage more efficient energy use is to change electric and gas utility rate structures to accurately reflect all of the internal and external costs of producing and delivering additional service. Present rate structures often encourage consumption by charging reduced per-unit prices for large consumers. Present pricing structures also make no attempt to discourage demand during periods of peak load. Peak load generation typically results in use of the least efficient generating equipment. Consumption during peak periods, then, is costlier than during off-peak hours.

The Wisconsin Public Service Commission recently made a landmark rate decision requiring a major electric utility to implement (1) "flat" rates, except where the traditional "declining block" rate structure can be proved to encourage the most efficient allocation of energy, and (2) a system of peak-load pricing that would result in higher rates during summer months, when the system's peak loads occur.

In California, the California Public Utilities Commission (CPUC) has rate-setting authority. The new State Energy Commission will not assume this function. The CPUC has recently undertaken a study of alternative rate structures to analyze possible new approaches for application in California. [E-f41]

Impact of Energy Producing Facilities on the Coastal Zone Can Be Reduced by Energy Conservation Measures. The need for energy-producing facilities can be reduced, and the impact on the coastal zone thereby lessened, by vigorous energy conservation measures. Substantial savings can be achieved by curtailing wasteful consumption of energy without harming the economy of the nation or the State. Some experts estimate that as much as 40 per cent of present total energy consumption is wasteful, and that conscientious application of a broad energy conservation program to all sectors of the energy market—homes, businesses, industry, and transportation—could halve our historical energy growth rate. The Ford Foundation Energy Policy Project, for example, concluded that the national energy growth rate could be reduced from the present level of nearly 5 per cent to 1.7 per cent annually without any significant adverse economic effects.

Forty Per Cent of Energy Used in Homes and Businesses Is Wasted. The residential and commercial sectors of society account for about one-third of the nation's annual energy consumption and their consumption is increasing at the rate of 5.4 per cent per year. Overall, it is estimated that nearly 40 per cent of the energy these sectors consume is wasted. Waste occurs due to poor insulation and ventilation; inefficient heating and cooling systems; poorly maintained and designed appliances; and wasteful use of lighting, appliances, and heating and cooling.

Energy Consumption in Industry Can Be Cut up to 30 Per Cent. The industrial sector accounts for about 41 per cent of total annual energy consumption in the U.S., and about 33 per cent in California. Although energy consumption per unit of industrial output has decreased over the decades, substantial energy waste still exists in energy-inefficient work schedules and industrial

processes, poorly maintained equipment and machinery, use of outdated direct-heat apparatus with heat transfer efficiencies as low as 5 per cent, and failure to recover and reuse waste heat and waste materials by recycling. Savings of at least 10 per cent of the energy used in the industrial sector should be possible with only minimal efforts, while 30 per cent or more could be saved with concerted application of currently feasible technology. [E-f39]

Energy Consumption in Transportation Can Be Cut by 15 to 25 Per Cent. Transportation of passengers and freight accounts for about 25 per cent of nationwide energy use, and nearly 35 per cent in California. Transportation modes have become increasingly energy consumptive. As presently used, automobiles, which account for 90 per cent of all passenger movement, use more than twice as much energy per passenger mile as buses; in large part this is because on the average each car carries only 1.3 passengers. Automobile inefficiency is increased by high-speed driving, air conditioners, automatic transmissions, poor tires, and unnecessarily large engine size and car weight. Remote, scattered, or low-density developments not only increase dependence on automobiles but also tend to require greater travel distances, causing increased air pollution and fuel consumption. About one-third of all freight transport in the nation is by truck, although trucks use over $3\frac{1}{2}$ times more energy per ton mile than railroads, and 5 times more than pipelines. Savings of 15 to 25 per cent are possible in the transportation sector using only short and mid-term conservation measures (e.g., consumer education, lower speed limits, rate and service improvements on public transit, and rail freight transport). [E-f39]

Energy Consumption in Electric Utilities Operations Can Be Reduced in Several Ways. Energy consumption in electric utilities operations can be reduced through improvements in power generation technologies; reductions in transmission losses by use of improved equipment and by siting generation facilities near to load centers; and use of once-through seawater cooling systems rather than evaporative cooling or dry tower systems. In electric utilities operations, the trade-offs for achievement of energy conservation are often stark: a utility may accept energy inefficiencies to avoid high capital costs of alternative equipment, to utilize a generation or cooling technology that meets its particular system needs (e.g., a gas peaking turbine or pumped hydropower project to meet peaking capacity needs), or for other economic considerations; similarly, a conservationist or land use planner may support equipment design or siting standards that sacrifice some energy efficiency in order to meet specific land use planning or environmental goals. [E-f39]

State Energy Commission Is Mandated to Develop Energy Conservation Programs. The State of California has already begun to move toward design of energy conservation measures for uniform implementation statewide. The State Energy Commission has a broad mandate to develop programs for reducing wasteful, unnecessary, inefficient, and uneconomic uses of energy through energy pricing strategies; improved lighting, insulation, climate control systems, and other building design and construction standards; improved standards for appliance efficiencies; and advances in power generation and transmission technologies. The Energy Commission will also design recommended per unit energy requirement allotments based on square footage (energy budget codes) for various classes of buildings. [E-f40]

Some Legislative Energy Conservation Measures Will Soon Be Implemented. Other energy conservation measures that have been initiated by the Legislature include: (1) SB 277, which requires development by the Department of Housing

and Community Development of minimum insulation standards for residential structures. Such standards have now been adopted by the Legislature as regulations effective February 22, 1975, to be applicable statewide and enforced by local agencies; (2) SB 144, requiring similar development of insulation standards for new non-residential structures, to become effective near the end of 1975; and (3) SB 1521, to eliminate pilot lights in gas appliances (see finding on page 177 for a more complete description). [E-f40] The CPUC has recently played an active role in energy conservation efforts by ordering utilities to undertake voluntary conservation programs and to mandatorily curtail uses by specific customer groups. [new]

Coastal Commission Needs to Develop Energy Conservation Policies as Interim Measures. Despite the broad mandate of the Energy Commission to develop energy conservation programs, and the strong interest in ultimately having such programs applied statewide, strong reasons remain for the Coastal Commission to develop policies for energy conservation. First, under AB 1975, it may be as long as 2½ years before Energy Commission regulations pertaining to lighting, insulation, climate control systems, and other building and design standards, including recommended energy budget codes, are developed and enforceable. In the interim, development in the coastal zone will continue; and there are many energy conservation measures already clearly identifiable that could serve as guidelines for immediate application to new construction to begin working toward reduction of energy demand growth. Second, the Energy Commission's mandate does not include land use and development planning measures designed to reduce energy consumption. [E-f40]

Energy Budget Codes Set Maximum Energy Consumption Levels. Experts believe that substantial reduction of energy consumption could be achieved by designing and implementing "energy budget codes," which would require new buildings to meet maximum allowable levels of energy consumption according to building type, net building floor area, number of stories, height of individual stories, and local climate, among other possible criteria. Use of energy budgets would require architects, engineers, and builders to design with some focus on energy conservation, but would afford them maximum flexibility as to what conservation measures to employ. The Ohio Board of Building Standards has recently adopted an energy budget code. The California State Energy Commission is mandated by AB 1575 to recommend per unit energy requirement allotments based on square footage for various classes of buildings. No date is set within which the State Energy Commission must perform this function. Standards developed will not be mandatory. [E-f48]

Lighting Consumes One-Fourth of U.S. Electricity. Lighting represents 20-25 per cent of all electricity sold in the U.S. In office buildings, lighting represents an average of 40 per cent and in some cases up to 60 per cent of electricity used. Decorative lighting, advertising and display lights, exterior wall lighting, and other promotional uses are also large users of electricity. [E-f43]

Lighting Levels Can Be Reduced Without Sacrificing Visual Acuity and Physiological Needs. Nationwide, average lighting intensity in commercial buildings has risen from 35 footcandles in 1940, to 85 in 1958, and to 124 at present. Many experiments confirm that lighting levels between 10 and 50 footcandles are sufficient for most visual acuity and physiological needs where levels of 60 to 150 footcandles are now being provided. Illumination levels can be significantly reduced in corridors, lobbies, passageways, and storage areas. Within work areas (e.g., classrooms or offices), use of selectively higher

lighting levels for "task zones" can both reduce total lighting needs and heighten the effectiveness of the people working in the area. Lighting levels for tasks up to 100 footcandles can be achieved in most buildings designed for a maximum average requirement of 2.3 watts per net rentable square foot.

Reduce Lighting Needs by Using Natural Light. Lighting needs can be further reduced by using natural light wherever possible to replace electrical lighting. In major multistory office buildings or schools, about 25 per cent of the energy normally used in lighting might be saved if the lighting fixtures near windows could be manually switched off, or automatically operated by a photo cell. [E-f43]

Fluorescent Lamps Are More Efficient than Incandescent Lamps. Incandescent light bulbs are inefficient energy converters. Less than 10 to 14 per cent of the energy consumed results in useful lighting; the rest goes into heat. fluorescent lamps are more than three times as efficient. [E-f43]

Heat-of-Light Systems Lower Resultant Heat and Need Less Cooling. Excessive and inefficient lighting also wastes energy indirectly by increasing the heat load, thereby increasing the need for cooling. Typically, every two watts of lighting requires one watt of cooling by air conditioning. "Heat-of-light" systems are available that reduce the amount of heat from lighting and thus the amount of air that must circulate in the air-conditioning system. [E-f43]

High Pressure Sodium Lamps Are More Efficient in Street Lighting. The high pressure sodium lamp (HPS) is a fairly recent development in street lighting and other outdoor illumination. For various lighting configurations, systems using mercury vapor lamps, which at present are most common, consume 2.3 to 2.9 times the energy required to produce an equivalent amount of light with a system using HPS lamps. The HPS lamp is initially costlier than the mercury vapor lamp; it also has a shorter life, and thus requires more investment in replacement lamps. Experts concur, however, that because of greater lamp efficiency, HPS systems are less costly over the system life cycle than mercury vapor lamps. Where existing street lighting in California uses series circuits, HPS lamps, which at present can operate only on a multiple circuit, are not compatible. In addition to using more efficient lamps, it may also be possible to reduce the illumination level of street lighting without adversely affecting public safety. [E-f43]

Outdoor Illuminated Signs and Ornamental Lighting Consumption Can Be Reduced by Regulation. Electrical consumption for promotional signs and lighting could be reduced through regulating the size, type of lighting, and extent of such uses. Regulation of signs for public safety and welfare reasons (including aesthetic values) has been upheld by court decisions. According to sign industry data, electric signs use less than 2/10 of 1 per cent of the total energy used in California (the percentage of total electricity used is slightly higher). New lighting standards for energy conservation will ultimately be developed and prescribed by the Energy Commission for mandatory application statewide. These standards are to be developed and applicable by mid-1977.

Fifty Per Cent of Heating/Cooling Demand Is Caused by Inadequate Insulation.

Of the total national consumption of energy, 18 per cent is for heating buildings. Only one out of every 10 buildings operates at 90 per cent or more of potential energy efficiency. Up to 50 per cent of the heating and cooling demand in buildings is a result of infiltration of outside air, due to inadequate insulation, caulking, and weather-stripping in almost all existing buildings. If these were improved in all existing buildings, 7.2 per cent of total nationwide energy consumption could be saved.

Stringent Insulation Standards in New Construction Can Achieve Significant Energy Savings.

In new construction, more stringent insulation standards (applicable to walls, ceilings, and floors) and double glass windows, possibly with special coating, could effect significant reductions of energy usage. Savings of up to 50 per cent of the energy required for heating and 20 per cent of the energy required for cooling in new residential construction and 10 per cent of both the heating and cooling energy in new commercial construction can be achieved. [E-f44]

Energy Consumption Doubles with Use of Electric Space Heating. Use of electric resistance space heating results in consumption of at least twice as much energy to heat a given space as direct use of a primary fuel (e.g., gas or oil). The conversion efficiency for a fossil or nuclear fuel thermal electric power plant is only about 35 per cent; inefficiencies in transmission and delivery systems still further reduce the overall conversion efficiency for electric space heating. If gas is used directly for space heating, overall conversion efficiency will range from 50 to 80 per cent, even considering inefficiencies due to improper furnace adjustment and start-up and shut-down operations. [E-f44]

Air Conditioning Puts Severe Seasonal Strain on Electric Generating Resources.

Air conditioning's share of annual total national energy consumption has grown from an infinitesimal amount 20 years ago, to 1.6 per cent in 1960, to 2.5 per cent in 1968, to possibly as much as 4 per cent now. Because most of this energy is consumed during just a few months of the year, the strain air conditioning loads put on electric generating resources can be severe. One of every two homes in the country has at least one room air conditioner. One-half of the houses being built today are centrally air conditioned, compared to 1/20th a decade ago. [E-f44]

With Proper Controls, Central Heating/Air Conditioning Systems Can Be Flexible and Efficient.

Among various types and makes of conventional room air conditioning units, energy efficiency in actual "cooling capability" can vary by as much as 80 per cent. Large central heating and air conditioning systems generally use 10 to 15 per cent less energy on the average than smaller decentralized systems. If central systems are to operate with the same flexibility as individual systems, however, proper controls must be installed. [E-f44] In portions of the temperate coastal zone, proper design of structures and landscaping can obviate the need for air conditioning.

Shading Windows from Direct Sunlight Can Substantially Reduce Heat Build-Up Inside Buildings.

The use of trees, shutters, sun screens, awnings, or roof overhangs to shade windows from direct sunlight can substantially reduce heat build-up in buildings, and thus air conditioning requirements. Special glazing (metal-coated and/or double wall glass) can cut both cooling and heating requirements by about half. It is much more efficient to screen glass on the exterior, rather than with blinds, drapes, etc., on the interior of a building. [E-f44]

Heat Transmission Rates Vary with Building Surfaces. Heat transmission rates are also affected by the proportion of exterior walls, the amount of surface area in windows (heat loss and gain from windows causes much greater energy use than the potential saving in natural lighting), and the color, orientation, shape, and angle or exposure of building surfaces. [E-f44]

Operable Windows Aid Natural Ventilation. Operable windows in lieu of fixed glass will allow natural ventilation to enter the building, eliminating some of the need for air conditioning and mechanical ventilation during much of the year. Such windows must be well fitted and weather-stripped to reduce infiltration of outside air. [E-f44]

Heating/Cooling Systems' Designs, Based on Outdoor Conditions, Can Be Redesigned for More Efficiency. Heating and cooling systems are usually based on outdoor conditions not exceeded more than 2-2½ per cent of the time. Except for facilities for the elderly, for industrial process, or for health care, such systems could be designed for the 5 per cent condition with only a slight increase in discomfort during a few hours per year. Excessive safety margins and failure to account for people and appliance heat-loads also result in oversized space conditioning equipment and inefficient operation. [E-f44]

Reduce Heating/Cooling Requirements by Reusing Already Circulated Air in Buildings. Heating and cooling of vast amounts of outdoor air that circulate through buildings can also consume energy wastefully. By reusing already circulated air, the amount of outdoor air required for ventilation can be substantially reduced, from 5-15 cfm (cubic feet per minute) per person to 3-4 cfm per person in most buildings. Air quality can be maintained by using odor-absorbing devices and better filtration. Initial costs are no greater, since savings in fans, heating and cooling equipment, and ductwork more than offset the added costs for better filters and odor absorption equipment, and there are significant savings in energy and operating costs. Heat exchangers which allow the use of already air-conditioned exhaust air from a building to preheat or precool system intake air, are a means for reducing heating and cooling requirements in large buildings. [E-f44]

Heat Exchangers Recapture the Energy of Waste Heat. The present lack of capability of buildings to store heat and cold and to control temperatures of appropriate areas separately results in a loss of energy which otherwise could be used later to offset peak electrical demand loads. Conventional chimneys, fireplaces, combustion devices, kitchen, laboratory, and laundry exhaust hoods are all energy wasters. Heat exchangers can be used to recapture energy otherwise given off as waste heat. [E-f44]

New State Insulation Standards for Residential Structures Will Soon Be Enforced. Pursuant to legislative mandate, the State Department of Housing and Community Development has developed new insulation standards, recently approved by the Legislature, for residential structures. The standards, enforced by local governments beginning February 22, 1975, prescribe maximum allowable heat loss values for ceiling, walls, and floors, and provide limits on the amount of glazing. The same agency is presently developing insulation standards for non-residential construction. All such standards shall be operative until superseded by standards developed by the State Energy Commission. [E-f44]

Gas Pilot Lights Waste Energy Except in Water Heaters. It is estimated that continually operated or lighted gas pilot lights consume more than 223 billion cubic feet of gas per year in the 30 million gas-heated homes in the U.S.

Pilots on gas dryers and other appliances in commercial, governmental, and industrial facilities wastefully use additional volumes of gas. Pilots use about one-third of a typical gas range's overall consumption, and in some cases may account for as much as 50 per cent of the gas use, especially if pilot flames are set too high.

Electric Ignition Devices Can Replace Pilots. Safe electric or other "intermittent" ignition devices actuated only when the appliance is in operation are available today to replace pilots in most residential-type appliances and can be built into new gas appliances or retrofitted to existing appliances. Electric ignition devices add to the initial cost of a new appliance (about \$3 to \$30); but given current gas shortages and rising prices, they are likely to be substantially less expensive to the consumer than pilot lights when costs are calculated over the life of the appliance. Replacing pilots in existing equipment, however, may cost \$80 to \$100, which may not be recouped through lower operating cost over the remaining life of the appliance. Unlike gas pilots in other fixtures, water heater pilots are efficient because the pilot flame contributes directly to heating the water. [E-f42]

Intermittent Ignition Devices Will Soon Be Required by Law. In May 1974, SB 1521 was approved, prohibiting the sale or installation of new residential-type gas appliances (furnace, air conditioner, heater, refrigerator, stove, range, dishwasher, dryer, decorative fireplace log, or other similar device, but not including a water heater) equipped with a pilot light 24 months after an intermittent ignition device has been demonstrated or certified by the State Energy Commission, or January 1977, whichever is later. This long lead time was included in the legislation primarily to guarantee advance notice to appliance manufacturers, retailers, and contractors. [E-f42]

Routine Maintenance of Gas Appliances Will Effect Energy Savings. The efficiency of most gas appliances, including water and space heaters, can be reduced as much as 50 per cent by dirt build-up or improper adjustment. Routine maintenance of such appliances could effect substantial energy savings. [E-f42]

Energy Savings Can Be Realized Through Improved Appliance Efficiencies. Home and business appliances using both electricity and natural gas account for approximately eight per cent of total national energy consumption. Water heaters alone use four per cent of the national energy budget. Appliances vary greatly in the amount of energy required for identical tasks. Innovations in appliance technologies frequently result in more energy-intensive appliances. Frost-free refrigerators and freezers, for example, use nearly twice as much energy as manual defrost units; and color televisions use about 40 per cent more energy than black and white sets. More efficient appliances may initially cost more, but they enable consumers to save money in operating costs. Labeling of appliances as to energy efficiency would enable the public to make informed purchases, and would encourage energy efficient design by appliance manufacturers. The State Energy Commission is mandated to prescribe standards for minimum levels of operating efficiency for all appliances whose use requires a significant amount of energy on a statewide basis. One year after adoption of such standards, sale of non-complying appliances in California will be illegal. [E-f46]

Aluminum Production Requires Six Times More Electric Energy than Steel. It takes approximately six times as much electric energy to produce a ton of aluminum as a ton of steel. Analysis of a high-rise building has demonstrated

that its skin would require 5.75 million pounds of stainless steel, which takes .77 million kwh to produce, compared to only 4 million pounds of aluminum, but which takes 2.1 million kwh to produce.

Wood Is the Only Renewable Major Building Material. Where wood is appropriate for use, it is significantly more favorable in energy required for production than steel or aluminum. The production of a ton of finished wood takes only 12 per cent of the energy required to produce a ton of steel and 2 per cent of that required to produce a ton of aluminum. Wood is also the only renewable major building material. Concrete and masonry have higher heat storage capacity and longer life cycles than metals or wood. [E-f47]

POLICIES

121. Restructure Utility Rates to Encourage Conservation. Utility rates should be restructured to encourage energy conservation and peak load demand reduction. The California Public Utilities Commission (CPUC) should revise rate structures to more accurately reflect the actual costs of production and transmission of a customer's gas and electricity. The State Energy Commission should assist the CPUC in the revisions as soon as it is able to do so. [E-p2]

122. Reduce Energy Consumption Statewide and in Coastal Developments. Non-essential consumption of energy should be reduced statewide, thereby reducing the adverse environmental impact of energy supply facilities on the coastal zone. [from E-p4]

- a. Statewide Energy Conservation Measures Recommended. The energy conservation standards contained in Policies 123 through 126 below clearly should be applied statewide and are therefore recommended to the State Energy Resources Conservation and Development Commission ("State Energy Commission") for its consideration in developing statewide energy conservation measures in fulfillment of its legislative mandate. [E-p4]
- b. Coastal Energy Conservation Standards May Also be Applied. If, for any reason, a significant energy conservation program is not in effect

statewide by January 1, 1977, then the standards set forth in Policies 123 through 126 below, or any improvement upon them recommended or enacted by the Energy Commission, shall be applied by the coastal agency to all development proposed within the agency's jurisdiction. Until that time, the application of such standards should be required to the maximum extent feasible in any development as a contribution to energy efficiency and resource conservation. [E-p4]

123. Reduce Consumption of Electricity for Lighting. Unnecessary lighting in new or substantially remodeled residential, commercial, institutional, or industrial development shall be reduced through State Energy Commission action (or by the coastal agency within its jurisdiction—see Policy 122) in the following ways. [E-p5]

- a. Regulate Lighting Levels. Lighting shall not exceed 2.3 watts (2.5 volt-amperes) per square foot except in instances where higher levels are shown to be necessary for high visual acuity tasks and public health and safety.
- b. Allow Only Efficient Lamps and Luminaires. Only efficient lamps and luminaires, as defined in the proposed Standard 90-F of the American Society of Heating, Ventilating, Refrigeration, and Air Conditioning Engineers (ASHRAE), shall be allowed.
- c. Provide for Selective On-Off Light Switching. In large office buildings, light switches shall be provided so that portions of the building, including portions of each floor, receiving adequate natural light, or not in use, can be switched off selectively.
- d. Use HPS Street Lighting. New street and highway lighting luminaires shall be of the high pressure sodium (HPS) type, or an approved alternative type equal in energy efficiency, unless there are environmental, aesthetic, or public safety reasons for utilizing a different type of

light source. [E-p5] Consideration should be given to establishment of a capital improvement fund, by passage of a State bond issue or by other appropriate State funding, for the conversion of existing State, county, and municipal incandescent or mercury vapor type street and highway lighting to high pressure sodium (HPS) type or equivalent. Conversion should take place as quickly as possible given the financial resources available and manufacturing and installation capacity. Funds expended could be repaid from energy cost savings resulting from the conversion. [E-p9d] Other appropriate energy-conserving devices (e.g., astronomical clocks that eliminate lighting during daylight) and designs shall also be incorporated in all new public lighting systems. [E-p5]

- e. Ban Lighted Advertising or Ornamental Signs. Proposed new advertising or ornamental signs, whether on business sites or off, shall not be electrically lighted, except that businesses shall be allowed on-site lighted identification signs containing only the name, address, and major product or service of the business, and these signs shall be illuminated during darkness only when the business is open to the public. (Incorporation of such standards in local sign ordinances, as prescribed in Policy 58, should be considered.)
- f. Minimize Building and Facade Lighting. Building and facade lighting, exclusive of signs, shall be no greater than 1,000 watts or 2 per cent of the total interior lighting load of the building, whichever is greater. On-site signs and facade lighting shall be included in the project's energy budget. [E-p5]

124. Reduce Consumption of Electricity for Heating and Cooling. Unnecessary use of electricity for heating, cooling, and ventilating in new or substantially remodeled residential, commercial, institutional, or industrial developments

shall be reduced through State Energy Commission action (or by the coastal agency within its jurisdiction—see Policy 122) in the following ways. [E-p6]

- a. Restrict Electric Resistance Heating. No electric resistance heating (water or space) shall be allowed unless: (1) an effective solar delivery system and/or natural gas service are not available or adequate for meeting energy requirements; (2) electrical heating is needed for medical, health, or public safety reasons; (3) some other unusually high requirement for clean heat exists; or (4) a back-up system for solar heating and cooling systems is required.
- b. Build to Reduce Air Conditioning Needs. Air conditioning needs shall be reduced by: (1) incorporating either mature planting, exterior architectural shading projections, or reflecting and/or insulating glass or exterior solar screens to shade or protect windows receiving direct sunlight in warm climates; (2) incorporating operable sash and vents in all exterior rooms for which ventilation is required by the local building code, and making such sash and vents weather-tight by use of weather-stripping; and (3) having variable thermostats for areas with different air conditioning requirements.
- c. Use Best Available Air Conditioning Technology. An air conditioning design using the best practical available technology with low-level or no electricity consumption shall be required. New conventional (compressive refrigeration) air conditioning shall be permitted only if an applicant can demonstrate that the life cycle costs of the conventional system are substantially less than the lowest cost alternative system available. The demonstration shall include a comparison of the conventional and potential alternative schemes, including electric energy consumption, cooling output, and life cycle cost, together with outline specifications and sketch plans to scale for

both the conventional and alternative systems. The comparison shall be submitted and signed by a California registered engineer. (Alternatives may include cooling systems based on evaporative cooling, solar cooling, nocturnal radiation, absorption refrigeration, heat pumps, rock bed regenerators, and coolness storage, among others.) [E-p6] (See the section on Alternative Energy Sources.)

Regional Amplification

South Coast and San Diego (and Central Coast as "guideline"): A fifth exception in subsection (a) is where a solar (water or space) heating system is capable of meeting over 50 per cent of the demand on the heating system, and a back-up system is required. [E-p6RA]

125. Reduce Wasteful Consumption of Natural Gas in Pilot Lights and Open Gas Flames. Wasteful use of natural gas in new or substantially remodeled residential, commercial, institutional, or industrial developments shall be reduced through State Energy Commission action (or by the coastal agency within its jurisdiction—see Policy 122) in the following ways. [E-p7]

- a. Use Intermittent Electrical Ignition Systems or Other Means. Intermittent electric ignition systems or other acceptable means shall be used in lieu of gas pilot lights in all residential, commercial, or industrial equipment (with the exception of water heater gas pilots) installed in proposed new construction or additions to existing structures unless it can be conclusively demonstrated that the gas pilot device: (1) has a substantially lower life cycle cost than an electric ignition or other alternative system, computed at prime interest rates; (2) that for particular equipment, the gas pilot light is more energy efficient than available alternatives; or (3) that public health or safety necessitates the use of gas pilots.
- b. Ban Open Gas Flames. Open gas flames for advertising, promotional, or decorative purposes shall not be allowed in proposed new industrial,

commercial, or residential construction or additions. This applies to both exterior and interior installations. [E-p7]

126. Establish Energy Budgets for New Developments. An energy budget code should be formulated, to be applied statewide by the Energy Commission to all new or substantially remodeled residential, commercial, institutional, and industrial developments. [E-p8]

- a. Proposed Energy Budget Code Criteria. The code should set required energy budget performance levels for a range of building types, sizes, occupancies, projected levels of intensity of use, and location. The energy budget shall state the energy inputs and outputs of the proposed building or other development in BTU's per cubic foot or in watts per square foot; and shall give the extreme mean heat loss/gain of all buildings in peak heating and cooling seasons. All proposals for enclosed developments shall include outline specifications for the following: microclimate description of the building site; microclimate modifiers such as planting; total building exterior cladding material; building insulation; building thermal inertia and energy storage capability; major building energy using and controlling equipment such as for lighting, heating, ventilating, and air conditioning.
- b. Projects Requiring Energy Budget Analysis. An energy budget, including outline specifications, shall be required for residential developments of four or more dwelling units, or commercial or industrial projects of 5,000 square feet of floor area or more. It shall be signed by a California registered engineer or certified architect. Proposed light commercial structures of less than 2,700 square feet may be exempted from the specification standards without submitting an energy system analysis, provided a California registered engineer or certified architect states in writing that the specific proposed design would be expected

to meet or have a lower annual energy consumption than the minimum established performance for the project type. Consideration should also be given to developing an exemption procedure for single family homes that would permit administration of energy conservation measures through local building codes without necessitating undue cost in the preparation of energy budgets.

c. Projects Meeting Budget Standard Exempt from Specification Requirements.

A proposed building or development that meets the required energy budget performance level set in the energy budget code, as shown through an energy system analysis, shall be exempt from such specification criteria as those described in Policies 123 through 125. [E-p8]

d. Research and Training Needed. To facilitate development and implementation of an energy budget code statewide, detailed research should be undertaken to define energy code standards, and a State-financed program of in-service training for building inspectors to administer the energy budget should be instituted. [E-p9]

e. Interim Budget Code for Coastal Developments. If the Energy Commission has not made substantial progress toward development of an energy budget code by January 1, 1977, the coastal agency shall consider adoption of an interim budget code, to be applied to all development proposed within the agency's jurisdiction. Such an interim code might be submitted by a responsible professional organization to the coastal agency for public hearing and possible adoption. If adopted, the energy budget code would be implemented through the coastal permit process in the same manner set forth above. Until January 1, 1977, the development and application of energy budgets should be encouraged as a contribution to energy efficiency and resource conservation. [E-p8]

127. Implement Other Energy Conservation Measures Statewide. The State Energy Commission and the State Legislature should, as part of a comprehensive statewide energy conservation program, implement certain other conservation measures statewide, as follows:

- a. Tax Heavier, Less Efficient Autos. Tax legislation should be enacted that encourages the use of lighter automobiles with smaller engines and increased energy efficiencies. [E-p9b]
- b. Discourage Inefficient Appliances. Legislation should be enacted requiring that (1) all appliances sold in California meet specified energy efficiency standards, and (2) all appliances be clearly labeled with energy efficiency or energy consumption information. [E-p9c]
- c. Improved Energy Use Standards of Existing Buildings. A long-range phased program for improving the energy use standards of existing buildings in California, including replacing energy inefficient equipment, should be devised and implemented. Special loans and/or tax incentives should be considered to assist in upgrading insulation, and incorporating low- or non-fuel-using technologies that involve higher capital costs. [E-p9a]

ALTERNATIVE ENERGY SOURCES

FINDINGS

Non-Petroleum Energy Sources Could Provide 50% of Added Generating Capacity in California by Year 2000. There are advantages and disadvantages to development and use of all forms of energy. Oil and gas, however, on which California now relies for about 90 per cent of its total primary energy, have the potential to cause significant adverse environmental impacts at all points of the fuel sequence: extraction, transportation, processing, and consumption. There are several alternatives to continued heavy dependence on oil and gas that are environmentally superior both for the coastal zone and for California, and that help conserve hydrocarbons for more valuable uses such as petrochemicals. These sources cannot in the short term supplant a continuing fundamental dependence on oil, gas, and even nuclear fission, in California. But with a strong policy commitment by government bodies and

electric utilities to high levels of research and development, and extensive marketing and public education, it is possible that non-petroleum alternative energy sources could provide as much as 50 per cent of the additional electrical generating capacity needed in California by the year 2000, and in so doing substantially reduce a broad array of environmental impacts on the coast and throughout California. [E-f49]

SOLAR ENERGY

Solar Energy Has High Potential and Fewest Environmental Problems. Solar energy is unlimited in its supply and appears to pose the fewest environmental problems of any major energy source. It will make a significant contribution on a smaller scale, as applied to heating and cooling individual buildings, and on a large scale, as applied to major electric power generation. The basic technology for solar energy applications exists; the principal remaining barriers to broad feasibility concern economics and engineering refinements to overcome the low energy intensity of sunlight, its daily and seasonal variability with weather and time, and the need for associated energy storage systems. There is also concern over the large land areas and fresh water for cooling that could be required for large-scale solar energy power stations. California is particularly well suited for development of solar energy because of its high number of hours of sunshine. [E-f54a] The South Coast Region lies in a particularly favorable location for mean daily solar radiation. As measured in units of Langleys (Ly), for comparison, the data for Seattle is 300 Ly, Phoenix 500 Ly, Los Angeles 463 Ly, and South Coast coastal locations about 450 Ly. [E-f54aRA]

Economic Barriers to Solar Energy Can Be Overcome. Solar energy systems for heating and cooling in new construction are now practical in both large commercial buildings and houses. Although the capital investment required for solar systems is higher than conventional systems (which increases marketing problems for home builders), any cost evaluation of heating systems should be done on a life cycle basis. Leasing systems, now being studied, may overcome some of the marketing problems. The life cycle costs of a solar heating and cooling system in the new General Services Administration building in Manchester, New Hampshire, for example, are estimated to be 25 per cent less than the costs of conventional electric resistance heating and electric compression cooling. The economic advantages of solar systems should improve as production techniques reduce the initial costs, and as the costs of conventional fuels increase. Economy and energy-efficiency can be further enhanced when: (1) both cooling and heating are accomplished through utilization of the solar energy collector; (2) the solar energy system components and the building heating and cooling systems are compatible with each other and are integrated in a total systems concept; and (3) the buildings and the conventional mechanical and electrical systems are initially designed and constructed to conserve energy. [E-f54c]

Implementation of Solar Systems in Southern California Can Save Natural Gas. Implementation of solar energy systems can be directly correlated with savings in natural gas. In a large area of Southern California, over two-thirds of the natural gas consumed directly in space and water heating could be saved by the use of solar energy. On a month-to-month basis, the share of space and water heating provided by solar energy can be expected to range from 50 per cent to 80 per cent. Since solar energy can supply the major share of energy for space and water heating on a year-round basis,

utilization of solar energy can directly reduce the growth in baseload demand for natural gas. A corresponding reduction in requirements for new gas supply would also be indicated, or, alternatively, more natural gas could be burned in the Region's electrical generating plants. [E-f54bRA]

Among the alternative heating and cooling systems (discussed below) that have energy saving potential are: (1) solar or solar-assisted heating and cooling; (2) heat pumps; (3) nocturnal cooling; and (4) rock-bed regenerators.

Solar Energy Can Heat Water and Heat/Cool Buildings. As many as 60,000 solar water heaters are said to be in use in south Florida today, nearly all having been installed in the 1930s and 1940s before the advent of all-electric living. They are also in common usage in several foreign countries including Japan, Australia, and Israel. With minor engineering developments and relatively simple architectural modifications, solar energy could now be used in some areas of this country for both space and water heating at prices competitive with oil and gas furnances. Commercially installed solar heating and cooling in single buildings may be in wide use in many parts of the nation by 1985 and will be common by 1993. It is possible that an intensive development effort could bring these dates five years closer. The National Science Foundation/NASA Solar Energy Panel predicted that ultimately solar energy could supply 35 per cent of the nearly 20 per cent of the U.S. energy consumption now consumed for heating and cooling, and that it will significantly reduce summer peak electricity demands. However, even if supported by energy storage systems, individual solar units may not be capable of supplying total energy needs for space conditioning and water heating. In addition to the solar units, builders may have to install some conventional supplemental equipment. [E-f54b] Solar active (mechanical heat transfer) systems—that is, solar systems using flat-plate solar collectors with circulating fluid—can optimally provide up to 90 per cent of the total water and space heating needs of a house in the Southern California coastal area, with gas assistance as the back-up fuel. Solar passive (direct heat transfer) systems, such as roof-pond system, can optimally provide up to 100 per cent of the heating and cooling needs of a house. [E-f54bRA]

Heat Pumps Can Heat or Cool a Given Space. A heat pump is, in effect, a refrigeration machine that can work in a reverse cycle; thus it can either heat or cool a given space. Large electric heat pumps can heat as efficiently as properly maintained gas furnaces; they can cool two to three times more efficiently than most cooling systems. A heat pump system can also be operated by solar power.

Nocturnal Cooling Is the Simplest System that Both Heats and Cools. Roof-pond nocturnal cooling systems are technically feasible and practical for residential and low-load buildings in desert or valley climates such as in southern California. The operating cost would be only a fraction of the cost of electrical refrigeration. This is the simplest system that can accomplish both heating and cooling.

Rock-Bed Regenerators Provide a Cooling System. Rock-bed regenerator (RBR) cooling systems use evaporation of water in the discharge air to chill rocks in a switched-bed rock-filled recuperator, which then cools inflow air. RBR's have been used successfully in Australia. The power consumption is an eighth of that needed for mechanical refrigeration. [E-f45]

Solar Energy Conversion in Existing Houses Is Difficult. Conversion of existing houses to solar energy is more problematical. No more than about 35 per cent of

existing houses can be retrofitted to solar energy because of shading by other buildings or trees, or because building orientations or roof angles are not suitable collectors. Retrofitting of older houses with solar systems would be difficult to justify on a life cycle cost basis because of the shorter remaining life of the buildings.

Effective Delivery System Soon Available. One of the major obstacles to near-term implementation of solar energy systems is the present lack of an effective large-scale delivery system (design, production, marketing, and installation skills). However, such a delivery system is now beginning to appear in California; several corporations have undertaken programs for production and marketing solar units. With some governmental encouragement, the delivery system necessary for broad implementation of solar systems could be available within a few years. [E-f54c] In the South Coast Region, an effective delivery system does not yet exist that is capable of supplying the design, technical, production, and installation skills at the scale needed for a significant percentage of new construction to incorporate solar-assisted water and space heating. However, such a delivery system is beginning to grow and has a high probability of reaching the needed scale between 1975 and 1978. [E-f54cRA]

Institutional Barriers to Solar Energy Use. Other barriers to wide use of solar systems are institutional. The building and real estate industries are slow to adopt and promote any new device that raises capital costs even if long-term overall costs are lower; there are no published building design guidelines for solar energy utilization; and there are no known existing building code regulations for solar units. In addition, although some electric utilities have made low-level research commitments to development of individual solar units, there has until recently been little or no serious commitment from electric utilities, State and county energy planners, or legislators to this application of solar energy. The Los Angeles City Council has begun a program of solar energy investigation and development, and as an initial step will heat municipal swimming pools with solar energy.

Solar Energy Use Needs Legislative Support. New legislation is needed to encourage the use of solar energy systems. Florida has passed a measure requiring new home plumbing to be designed to facilitate future installation of solar water heating equipment. Arizona and Indiana have passed tax legislation encouraging installation of solar equipment. Essential to any solar energy program would be a public information program.

Sun Rights Legislation Will Ensure Access to Solar Radiation. "Sun rights" legislation is needed to ensure user's access to solar radiation free and clear of potential obstructions on contiguous property. Appropriate regulations must consider the shadows, angles, and orientation of buildings varying with the time of day, the season, climatological conditions, and the slope of the building site. Setback regulations in zoning codes are precedents for sun rights laws. [E-f54d]

Large-Scale Electricity Generation Needs Further Development. The full potential of solar energy can be realized only after large-scale generation of electricity from solar energy becomes technically and economically feasible. Steam-electric systems based on the initial conversion of solar energy to heat have yet to be built on any but the smallest scale, and the necessary technology for large-scale plants, though well understood theoretically, has not been adequately demonstrated on a commercial scale. The principal problem scientists and engineers face is making solar-generated power economically competitive with

other electric power sources. The constraint of high initial costs may without government encouragement, delay the commercial testing of large-scale solar-thermal power generation until 1990, although unforeseen and unprecedented rises in fossil fuel prices since mid-1973 have suddenly made solar-thermal power significantly more competitive. [E-f54e]

High Solar Plant Potential in Southeast California. Solar collecting equipment for large-scale solar-thermal plants can be centralized for commercial production of power only in areas with high annual sunlight-hour values. Much of southern, and particularly southeastern California, receives as much solar radiation and annual sunshine—up to 4,000 hours per year—as any other area in the U.S. [E-f54f]

Solar-Thermal Power Plants Need Large Amounts of Land. The principal environmental concern about large-scale solar-thermal power plants is the commitment of many square miles of land to collecting surfaces. The NSF/NASA Solar Energy Panel estimated that at 20 per cent efficiency a 1,000 Mw solar generating plant—about the size of the nuclear power plant units being built today—will require about 15 square miles or 9,600 acres of land. It is difficult to compare this with the amounts of land required by different methods of electrical energy generation, but the 2,000 Mw coal-burning plant in the Four Corners area, for example, will require the strip mining of 40 square miles of land for fuel during its operating lifetime. Improved technology resulting in better efficiency would significantly reduce land use for solar plants. [E-f54g]

Solar-Thermal Power Plants Create Heat Waste Disposal Problem. The potential for waste heat disposal problems would still be present in large-scale solar-thermal power plants. Such plants would still require cooling water, and this may be a problem since the optimal locations for solar plants will be arid. There is also some concern that large-scale solar collecting surfaces may upset local thermal balances, but the consequences, if any, are thus far expected to be quite small. [E-f54h]

Solar Cells Offer Alternative to Solar-Thermal Power Generation. A second approach to production of electricity from solar energy involves the use of solar cells. Solar cells convert sunlight directly into electricity without the need for intermediate thermodynamic cycles. Solar cells were used to power manned orbiting spacecraft. Presently, however, solar cells are too costly, too inefficient, and not sufficiently durable to have practical application for large-scale commercial electricity production. Some scientists believe, however, that solar cell technology is sufficiently far advanced that mass production of rooftop units for new housing could become competitive within three to five years, and that use of solar cells to power new houses may be common in ten years. [E-f54i]

Potential for Ocean Thermal Gradient Electricity Generation Is Small. One approach to production of energy from solar energy involves the use of the difference in temperature between the sun-warmed ocean surface and the cold ocean depths in a heat engine to produce low pressure steam to drive a turbine and produce electricity. Ocean waters off the California coast, however, offer insufficient temperature differences. [E-f54k]

WIND ENERGY

Wind Is Potentially Important Energy Source. Wind energy is pollution-free, involves no fuel costs, and is non-depletable. If wind were actively promoted,

and its problems solved, it could become an important auxiliary energy source. Various sources indicate that by the year 2000 wind energy could provide from 1 to 20 per cent of total national electrical energy needs. Thus far, however, no California public agency or electric utility forecast for future California energy supply includes any contribution from wind energy.

Some Potential for Individual Windmill Units. Individual windmill generating units can make single buildings or small building clusters wholly or partially energy self-sufficient, but such units are no longer manufactured in quantity, and individual unit capital cost (including battery storage) is presently high.

Problems of Wind Energy Must be Solved. Wind is a problematic source of electrical energy. It is erratic, low in average velocity and density, and variable in direction, and its energy is not easily stored on a large scale. Wind will make its most significant contributions to energy needs only when systems have been developed that can efficiently and inexpensively convert wind to electricity or other energy forms on a very large scale. Scientists believe that these problems are not technologically difficult. [E-f55]

Wind Energy Generation Does Pose Environmental Concerns. The principal environmental concern about wind generation is with the appearance and noise of both individual and large-scale wind generation equipment in scenic coastal areas. Offshore locations could mitigate these concerns.

More Wind Research Is Necessary. Additional wind research is required to establish the ultimate potential of California's coastal and inland wind resource. [E-f55]

SOLID WASTES

Solid Wastes a Potentially Important Energy Resource. Solid wastes represent still another resource with substantial energy potential already exploited in other parts of the world, although recycling of suitable waste material may result in greater overall benefits to society from both an energy and a resource preservation point of view. Half of the 75 million tons of solid wastes produced annually in California is collectable, and that refuse could furnish 10 per cent of the fuel oil needed by utilities at prices competitive with other power generation fuels, or could furnish gas for direct use by residential and commercial customers. Despite the significant potential of solid waste conversion for reducing the demand for depletable fossil fuels and nuclear expansion in California, few efforts have been made to realize the potential. The State Solid Waste Management Board, legislatively established in 1972, may help overcome institutional problems that partially impede development of State and county programs for the recovery of energy—and materials—from solid waste. Detailed below are four principal methods of energy recovery from wastes.

Incineration Already in Use in Two Major American Cities. Incineration, or direct burning, of refuse can produce recoverable heat for production of steam, which in turn can be used in power plants (St. Louis), in industry, and in local heating and cooling systems (Nashville). Incineration systems can present air pollution problems. [E-f56]

Pyrolysis Pilot Project Proposed for El Cajon. Pyrolysis is a flexible method by which separated, shredded, treated wastes are heated in a kiln to cause

their chemical decomposition into various low heat-value gaseous or liquid hydrocarbons. These can be utilized with other fuels in conventional fossil fuel plants. SRI expects commercial systems will be available in 1976-77. An EPA-funded pilot plant proposed for El Cajon would process about 200 tons of solid wastes per day, with each ton ultimately producing one barrel of low heat-value oil. San Diego Gas & Electric would burn the oil either directly or mixed with No. 6 fuel oil to produce steam for electric power generation. A Baltimore pilot project newly in operation will convert 1,000 tons per day into gas for steam generation.

Hydrogenation Most Efficient System for Obtaining Oil from Wastes. Hydrogenation involves adding steam carbon monoxide, and a catalyst to organic wastes in a pressurized container, and heating it to cause chemical reduction into a heavy paraffinic oil and other hydrocarbon forms. A system using dry waste solids can produce as much as two barrels of oil per ton of solids. Several pilot plants are in operation or are planned with commercial application expected by 1980. [E-f56]

Bacterial Conversion Can Produce Methane Gas from Solid and Liquid Wastes. Bacterial conversion is a process using anaerobic bacteria (which flourish without free oxygen) to decompose organic wastes to produce a mixture that is 72 per cent methane—the principal component of gas. A ton of dry organic waste can produce 10-20,000 cubic feet of methane. Commercial recovery of methane is feasible at sanitary land fills. Sanitary engineering has long utilized anaerobic digestion, but use of this process to maximize methane recovery has received little or no attention. Methane recovery from the secondary treatment of liquid wastes can make an important incremental contribution to natural gas supplies. [E-f56]

METHANOL

Methanol Provides a Versatile Fuel for Immediate Use. Methanol, or methyl alcohol, constitutes an alternative fuel form whose widespread use could immediately help to solve both energy supply and pollution problems. Methanol is a colorless, odorless liquid which can be made from practically any other fuel—natural gas, petroleum, coal, oil shale, wood, and farm and municipal wastes—giving methanol practically unlimited flexibility in utilizing various energy sources as the economy and conditions dictate, and offering a means of reducing the nation's waste disposal problems.

Methanol Can Be Easily Implemented into Present Fuel Economy. Methanol use would not require any major changes in current technology to accommodate its integration into the present economy. It can be easily stored in tanks in the same manner as conventional fuels and can be shipped or piped, as can conventional petroleum products. More importantly, up to 15 per cent methanol can be added to commercial gasoline in cars now in use without requiring engine modification. Some carburetor adjustment would be required. This methanol-gasoline mixture results in higher octane ratings (thus reducing the need for lead), improved economy, lower exhaust temperatures, lower emissions, and improved performance. Tests have shown that engine conversions to accommodate 100 per cent methanol, which cost about \$100 per vehicle, result in one-twentieth the amount of unburned fuel and one-tenth the amount of carbon monoxide released to the atmosphere compared to burning gasoline, and would eliminate the need for catalytic treatment of exhaust. Even greater economy and performance could be expected from engines designed specifically for the use of methanol. [E-f59]

Methanol Can Be Used in Electric Power Generation. A potential use of methanol is for electric power generation, particularly in gas turbines. A recent test comparing use of methyl fuel with use of No. 5 fuel oil and natural gas in a full-scale boiler demonstrated that use of methyl fuel resulted in elimination of particulate and sulfur compound emissions, substantial reductions in nitrogen oxide emissions and carbon oxide concentrations; and negligible emissions of aldehydes, acids, and unburned hydrocarbons. Soot deposits in the furnace from previous oil firing were burned off with methyl fuel, thereby allowing higher heat transfer rates and higher efficiencies. [E-f59]

Availability Is One of the Problems in the Use of Methanol. The principal drawback to the immediate use of methanol is its availability. The technology for initial production and use on a large scale exists. A 1972 AEC report estimates the cost of producing methanol from lignite, coal, and natural gas to be slightly higher than the costs of producing gasoline from crude oil. Since 1972, however, the cost of crude oil, particularly from foreign sources, has increased dramatically, thereby making methanol production comparatively more economical. The use of methanol in automobiles will require larger fuel tanks, since specific fuel consumption of methanol is higher on a weight and volume basis than gasoline. However, specific energy consumption per mile will be lower because higher compression ratios and simpler pollution controls can be used. The storage of methanol mixed with gasoline may present some problems because methanol is much more soluble with water than is gasoline; where condensation will form in gasoline storage tanks (sometimes causing corrosion) methanol will absorb the water, keeping the tanks dry. Problems may arise in the storage of large quantities of methanol mixed with gasoline, unless the tanks are dried out prior to injection. Distribution systems for methanol fuels must also be more water-free than existing gasoline distribution systems. A further problem is the corrosive effect of methanol upon some kinds of metals used in fuel distribution and storage facilities (including auto fuel tanks). [E-f59]

HYDROPOWER

Hydropower's Role in Future Energy Mix Is Limited. The percentage of California's energy and electricity supply provided by hydropower has declined sharply from 59.7 per cent of the total electricity supply in 1950 to about 36 per cent in 1970 (9 per cent of the State's overall energy supply). Hydropower appears unlikely to meet any substantial part of an increase in the State's energy needs. There are undeveloped potential hydropower sites in California; however, their limited potential, combined with concern about the environmental impact of such facilities, land use conflicts, and high capital costs, may preclude significant future hydropower development within the State. [E-f50]

California Imports Significant Portion of Hydroelectric Power. In 1970, 23 per cent of California's hydroelectric power was transmitted from facilities located along the lower Colorado River and in the Pacific Northwest. Because of the expected increase of energy demand within the latter area, however, it is possible that export of electrical energy to California in future years may significantly decline. [E-f50]

Pumped Hydropower May Be Used to Store Energy. A principal use of hydropower in the future may be in "pumped hydropower" projects for storing energy to meet peak demand. Such projects would permit more efficient use of base load power plants, and would help reduce the need for additional power

plants otherwise necessary primarily to meet peak demand, although in some instances such projects may require more electrical energy for pumping than they actually produce. Present plans of electric utilities project 3,600 megawatts of pumped hydro capacity by 1991, and one source forecasts 10,500 Mw pumped hydro capacity by 2000. Pumped hydro projects can in some instances be built at existing hydroelectric sites, but will in other instances involve reservoir and dam construction, with attendant land use and environmental problems, and with loss of fresh water and increased water salinity due to evaporation. [E-f50]

COAL

Importance of Coal as a Direct Fuel in California Is Minimal. Although the U.S. has an overwhelming abundance of coal, California has no significant indigenous coal supplies. Coal has not traditionally been an important fuel in California; the high costs of transporting it, and the lack of large coal deposits closer than 350-550 miles from the State's major cities, have made coal a poor primary energy alternative in a state relatively rich in oil and gas. Strict State air quality regulations have made coal a still less attractive fuel in California, though desulfurization and particulate control are available. [E-f51]

California Imports Electricity Generated by Out-of-State Coal-Fired Plants. In 1970 coal provided only 1 per cent of California's energy needs. By 1985 this figure is predicted to rise to 3 per cent. Most of this increase will be accounted for by increases in the amount of coal-fired electricity generated in Arizona, Nevada, or the Four Corners area and imported by high-voltage transmission into southern California. SRI has estimated that 5,000 to 15,000 Mw of electric generation capacity from out-of-State coal-burning power plants could be available to California users by 2000. [E-f51]

Synthetic Natural Gas to be Produced from Coal and Imported to California. When commercial production of synthetic natural gas (SNG) from coal is begun in the Rocky Mountain coal deposit areas, California will begin to receive some measure of SNG from coal by pipeline—primarily for residential and commercial use. If large-scale gasification plants scheduled for construction and operation near mine sites in the Western states should come on line as scheduled, such SNG imports could begin as early as 1978-79. SRI has predicted that SNG from coal may constitute as much as 16 per cent of California's natural gas use by 1990. The cost of developing such sources, as well as the amount of water required, has put some of the more optimistic figures in doubt.

Environmental Problems from Use of Coal. The coal mining and coal conversion operations in the Rocky Mountains and Four Corners areas have severe environmental consequences in the immediate mining areas. [E-f51]

NUCLEAR FISSION

Nuclear Fission Power Generation Expected to Grow; Public Safety Problems. The AEC has predicted that nuclear energy will become the dominant source of electricity in the 1990s and will account for as much as 60 per cent of the nation's generating capacity in the year 2000. The proponents of nuclear power point out that it is smog-free, and that its use reduces air pollution that would otherwise result from fossil fuel power generation, and conserves fossil fuels. They also argue that nuclear energy is safe and the prospects

of a serious accident extremely small, and express optimism over the resolution of radioactive waste disposal problems. Reliability and high cost factors in nuclear reactors are also of increasing concern. There is a growing public concern, however, over such matters as the safety hazard associated with the potential for a serious accident that might permit escape of radioactive material; the possibility of acts of sabotage or terrorism using nuclear materials stolen prior to or during the transport of fuels or wastes; and the uncertainty as to how to dispose safely of nuclear waste materials that will remain highly toxic for many thousands of years.

Nuclear Plants Require Cooling Systems. Light-water reactors (LWRs), in which the U.S. has invested most heavily, are thermally less efficient than fossil fuel power plants, and therefore emit more waste heat. High-temperature gas-cooled reactors (HTGRs) are thermally as efficient as the most modern fossil fuel plants. Systems for dissipation of waste heat can have significant environmental and land and water use impacts. [E-f52]

Breeder Reactors Also Have Problems. France, England, and the U.S.S.R. have experimental liquid-metal fast breeder reactors (LMFBRs) in operation at this time. The Federal government is committed to the rapid development and widespread deployment of this technology. Most of the problems associated with converter reactors also affect breeder reactor development. In fact, because breeder reactors require a fast neutron flux and a highly concentrated fuel, they actually present greater health and safety problems than conventional reactor technology. [E-f52]

Accelerated Breeder Reactor Program May Be Unwarranted. The breeder reactor program is being accelerated because of an apparent fear of an eventual shortage of uranium, but a California Institute of Technology study shows that even the most enthusiastic projection of the expansion of nuclear power generation through 2020 could be fueled from presently known domestic uranium supplies. Though the cost for these supplies would rise, the effect on the average delivered cost of electricity would be minor. Other recent analyses have similarly concluded that there is not sufficient justification for an accelerated breeder reactor development program. [E-f52]

GEOTHERMAL

Geothermal Power Is a Desirable Energy Source. Geothermal energy has great potential in California. Despite environmental problems of waste water disposal, soil erosion, disruption of wildlife habitat, disposal of drilling muds, hydrogen sulfide and small Radon 222 air emissions, land subsidence, and noise (all of which experts believe are manageable), the geothermal fuel cycle is less polluting than that of fossil or uranium fuels. Geothermal energy represents a very long-term resource that may have the potential to supply up to 15 per cent of the additional electrical energy capacity required by 2000. California's only commercial electrical energy produced from geothermal is from a dry steam field called The Geysers in Sonoma County, under development by PG&E; geothermal energy has non-electric applications in California for heating water and buildings and for recreation (hot mineral baths, for example). [E-f53]

Geothermal Potential Is Significant. There are 35 potential geothermal resource areas covering more than 15 million acres within California. Geologic research and activity has largely been confined to the three most promising sites: The Geysers, with a present capacity in excess of 400 Mw; the Imperial Valley; and

the Mono Lake-Long Valley area. A fairly conservative range of potential generating capacities from geothermal sources is as follows (listed in megawatts):

	<u>The Geysers</u>	<u>Imperial Valley</u>	<u>Other Areas</u>
1980	1,300	0-700	0
1990	1,300-3,000	1,000-4,000	0-3,000
2000	1,300-5,000	1,000-8,000	0-3,000 [E-f53]

TIDAL ENERGY

Tidal Energy Not Promising in California. Although the total potential energy in the world's tides is enormous, and represents a nondepletable source of energy, present technology can only economically convert tidal energy to electricity where tidal ranges are very large and inlet mouths are small enough to make damming for a hydroelectric plant feasible. Such conditions are rare, and exist nowhere in the U.S. except in Maine and Alaska. The damming of an entire bay or estuary for a tidal hydroelectric generating plant has severe environmental and ecological effects. Unless there is a radical redesign of existing technology for the conversion of tidal energy California should not expect tidal energy to make a contribution to meeting its energy requirements. [E-f57]

NUCLEAR FUSION

Nuclear Fusion Is not a Commercial Reality in this Century. Nuclear fusion differs from nuclear fission in that energy is released through fusing the nuclei of two atoms, rather than through splitting atoms. Nuclear fusion would use as basic fuel heavy hydrogen, which is limitlessly available in seawater. The various economic, environmental, and safety advantages expected from nuclear fusion appear to make it a significantly more viable long-term energy alternative than fossil fuels or nuclear fission. Even with greatly increased research and development activity, however, most experts believe that various theoretical and technical problems still blocking the path to electricity from fusion are so enormous that fusion probably will not become a commercial reality or a significant factor in meeting California or national energy needs within this century. [E-f58]

ENERGY STORAGE

Energy Storage Increasingly Important in Energy Systems Planning. Energy storage is becoming increasingly important in planning energy systems that minimize the environmental impact of meeting energy demand. Energy storage techniques can be applied to enable longer periods of operation for base load power plants and thereby reduce the requirement for additional generating facilities; to change energy from one form to another for more economical, convenient, or environmentally clean transmittal or application; and to make practically feasible such alternative energy sources as solar, wind, tidal, and thermal gradients, which produce energy inconsistently or at a very slow rate. Significant energy storage techniques include pumped hydro storage, fuel cells, storage batteries, flywheels, and conversion of energy in other forms into hydrogen. [E-f60]

POLICIES

128. Encourage Development of Alternative Energy Sources. Development of alternative energy sources should be encouraged for large-scale power-generating facilities in new and existing small-scale developments.

- a. Require Consideration of Alternative Energy Sources. The coastal agency shall require that every application for a major energy installation include detailed evaluation of alternative methods for providing the same amount of energy to customers. [E-pl0a]
- b. Encourage Energy Efficient and Energy Self-Sufficient Development. The State Legislature should enact laws providing tax incentives for building owners or developers to install low- or non-fossil fuel energy systems, which might include solar-assisted water and space heating, solar-assisted cooling, nocturnal cooling, evaporative cooling, heat pumps, absorption refrigeration, photovoltaic electrical energy generation, total energy systems with waste heat recovery, anaerobic sewage generation of methane gas for energy use, windmill electric generators, fuel cells, and energy storage systems and other feasible alternative energy systems. Such tax incentives might include, for example, investment credits to owners of buildings or a reduced property tax rate on buildings so equipped. [E-pl0]

129. Implement Use of Solar-Assisted Heating and Solar-Assisted and Nocturnal Cooling. The following measures are recommended to the State Energy Commission for its consideration in developing statewide programs for implementing alternative technologies, and shall be applied by the coastal agency within its jurisdiction if a significant program is not in effect statewide by January 1, 1977.

- a. Require Alternative Heating and Cooling Systems. Solar-assisted water and space heating systems and solar-assisted or nocturnal cooling systems (where buildings require cooling systems) shall be required on all new or substantially remodeled single or multiple-unit residential structures;

on commercial, institutional, and industrial structures; and on heating systems for such facilities as swimming and hydro pools. This policy shall go into effect when the State Energy Commission (or the coastal agency, after January 1, 1977) has determined, after appropriate public hearings, that an effective delivery system exists in California—that is, that the professional expertise in design, manufacture, installation and maintenance of solar-assisted heating systems or solar-assisted or nocturnal cooling systems capable of meeting at least 50 per cent of the building's projected heating or cooling needs with a high degree of reliability, exists in the State, and that the necessary hardware is commercially available. Such a determination should take into account the varying meteorological conditions throughout the State. [E-p11a]

- b. Where Policy Shall Not Apply. In the case of solar-assisted heating and cooling systems, this policy shall not apply to any residential, commercial, or industrial building (1) where, because of the site conditions and adjacent existing or possible obstructions, over 50 per cent of the potential collector surface would be in shade between the hours of 10 a.m. and 2 p.m. on the Winter Solstice (December 22); (2) where an applicant can show that a solar-assisted system could not be incorporated in his project within a reasonable period of time; (3) where an applicant can show that the best practical and available solar system will not provide a lower life cycle cost than the proposed conventional system at an interest rate equivalent to the prime interest rate on the subject type of construction. [E-p11]
- c. Testing and Certification; Retrofitting of Solar Heating Systems; "Sun Rights" Ordinances. In conjunction with this policy, the State Energy Commission and the State Legislature should (1) set testing and certification standards for solar systems; (2) undertake a program that will lead

to retrofitting with solar heating systems existing buildings and swimming or hydro pools that use gas and/or electricity, wherever technically and economically feasible; (3) require that local government agencies adopt "sun rights" ordinances relating to building setbacks, heights, bulk, orientation, air rights, densities, and landscaping, to ensure that owners of buildings or property will have the benefits of free and clear access to sun radiation on existing or potential collector systems at all times of the year. [E-p11b]

- d. Require Capability to Incorporate Solar Collector System. Until it has been determined that an effective delivery system does exist, the coastal agency shall condition all new residential and commercial structures proposed in the coastal agency's jurisdiction by requiring that they (1) have the structural and design capability to later incorporate a flat plate or other type of solar collector system capable of reducing by 50 per cent the gas or electricity used for water and space heating; (2) be built according to site plans that guarantee solar collectors clear and optimum exposure to the sun; and (3) shall install the solar-assisted water and space heating systems upon the order of the coastal agency, after a public hearing where it has been determined that a solar-assisted system with a life-cycle cost lower than conventional systems is available. Such solar systems shall include adequate energy storage capability to provide heat during periods of abnormally severe weather conditions and to prevent unnecessarily high peak loads on conventional generating facilities caused by use of conventional back-up systems. Consideration should be given to requiring performance bonds to ensure compliance. [E-p11]

130. Determine Potential of Alternative Energy Sources and Promote Resolution of Related Implementation Problems. The State Energy Commission, the California

Public Utilities Commission, the State Legislature, and where appropriate such State agencies as the Division of Oil and Gas, the Geothermal Resources Board, the Solid Waste Management Control Board, and the State Water Resources Control Board, should undertake research and development programs to (1) resolve technological, environmental, economic, institutional, and legal problems presently hindering development of the large geothermal resource present in California; (2) determine the potentials for large-scale commercial and single-building solar and wind generation, analyze the problems impeding early development of those potentials, consistent with other Coastal Plan policies, and actively promote development and implementation of solar and wind conversion technologies; (3) implement a program for recovering energy and materials from solid wastes (including animals wastes) and sewage and for using methanol as a more efficient, less polluting fuel form to substitute for other conventional hydrocarbon forms. [E-pl2]

Energy Facility Siting and Design

FINDINGS

Warren-Alquist Energy Act Creates New State Energy Commission. On January 7, 1975, the new California Energy Resources Conservation and Development Commission (hereafter referred to as the State Energy Commission) came into existence. This new Commission, created through passage of the Warren-Alquist Energy Act (AB 1575) in the 1974 Legislative session, has a broad mandate (1) to assess trends and to forecast statewide demand for electricity and other forms of energy; (2) to determine the need for new power plants and to evaluate and certify proposed designs and sites either on the coast or inland (power plants in the coastal permit zone still require separate Coastal Commission permit approval); (3) to study and promote the development of new alternative energy resources and new generation and transmission techniques; (4) to prescribe and carry out new and expanded energy conservation measures; and (5) to make recommendations to the Governor and Legislature for State policies and actions for the orderly development of all potential sources of energy to meet the State's needs, among other duties. [E-f3]

Siting Authority of State Energy Commission Is Limited. Despite its very broad mandate to act on energy issues, the State Energy Commission has authority

to approve siting for only one of the five types of energy supply-related development that could affect the coastal zone: electric power plants and transmission facilities. Most of the new power plants presently being planned, however, are explicitly exempted from the provisions of the Energy Act. More significantly, under its present mandate, the State Energy Commission will not determine when or where exploration and development of State offshore oil reserves will occur, or have permit authority for siting onshore facilities associated with State and Federal offshore oil development, tanker terminals, refineries, or liquefied natural gas terminal and gasification facilities.

Other Agencies Lack Sufficient Jurisdiction. Other State agencies, such as the State Lands Commission, the California Public Utilities Commission, the State Water Resources Control Board, the Division of Oil and Gas, and the Air Resources Board, all regulate activities affecting energy development in California, but none has the jurisdiction over all such facilities that would permit a comprehensive, balanced approach to energy conservation and development throughout the State. [E-f4]

Coastal Commission has Permit Authority Over Energy Facilities Along Coast. Because of the Energy Commission's limited siting authority, and because AB 1575 gives the Coastal Commission a separate permit authority for power plants proposed within the coastal permit area, the Coastal Commission must develop energy facilities siting policies to meet its own planning mandate and deadlines, recognizing that these decisions may ultimately be reviewed by the Energy Commission. [E-f4]

Coordination by One Statewide Energy Authority Needed. Determinations of energy needs and development of an inventory of sites for all major energy facilities might best be coordinated by a single statewide energy authority, with the opportunity for intensive review and comment at all planning stages afforded to all concerned agencies, and with a separate permit authority for the environmental and land use aspects of coastal siting decisions reserved to the coastal agency. [E-f4]

Coastal Agency Can Work Closely with Other Agencies on Siting Permits. The goal of comprehensive energy planning will be best served by the coastal agency's working closely with the Energy Commission and other State and local agencies in developing its siting policies and evaluating permit applications. [E-f4]

POLICY

131. Need for a Statewide Agency to Plan and Regulate Energy Facilities.

The Legislature should extend the permit authority of the State Energy Resources Conservation and Development Commission (hereinafter referred to as the State Energy Commission) to all oil and gas production, processing, and transmission facilities as well as power plants within the State. The coastal agency should have permit authority concurrent with such authority of the State Energy Commission over the environmental and land use aspects of any

such facilities proposed in whole or in part within the coastal zone. The coastal agency should participate fully in review and comment procedures established by the State Energy Commission for all initial stages of planning.

[E-p1]

POWER PLANTS

FINDINGS

Several New Power Plant Sites Will Be Needed. Additional fossil fueled and nuclear power plants may be needed in the future even if energy conservation programs are successfully implemented and alternative energy sources become commercially available. Under reasonable assumptions regarding demand growth, and assuming 2,000-6,000 megawatts (Mw) per site with some expansion at existing sites, 7 to 20 major new fossil or nuclear power plant sites may be needed by the year 2000 for California. With a particularly vigorous and successful effort to develop alternative energy sources and implement conservation measures, it is possible that as few as 3 to 9 new fossil or nuclear power plant sites may be needed Statewide. With successful electricity conservation measures, the lower ends of these ranges may prove attainable. [E-f61]

Alternative Energy Sources Will Also Require Power Generation Sites. Development of alternative energy sources such as solar, geothermal, wind, etc., will also require sites for power generation facilities. However, only wind may require large-scale facilities sited on the coast. Solid waste processing plants could theoretically be sited in the coastal zone, but are not coastal-dependent. Geothermal and large-scale solar plants will be located inland. Large-scale wind generation units would present aesthetic and land use problems, though design specifications are uncertain at this time. Small-scale or building use of solar or wind energy in the coastal zone would occur as part of building construction, and present few significant adverse environmental impacts. [E-f62]

Nuclear Power Plant Siting Concerns. The major concerns involved in nuclear power plant siting on the coast are: (1) safety hazards resulting from the high potential for strong earthquake events in much of the coastal zone (see Development chapter section on Geologic Hazard Areas) or from the potential for serious accident (e.g., loss of coolant) that could permit escape of radioactive materials; (2) proximity of nuclear power plants to population centers on the coast; (3) effects on the productive nearshore marine environment of entrainment and thermal or chemical discharges from the cooling systems; (4) the impact of plant and associated structures, such as switchyards and transmission lines, on scenic natural areas; and (5) alteration and permanent use of sizable quantities of land for the plant itself, cooling towers, switchyards, transmission lines, and transportation and storage facilities.

Fossil Fuel Plant Siting Concerns. The major concerns involved in fossil fuel power plants on the coast are: (1) public health and safety hazards from

air pollution and the transportation of volatile fuels; (2) effects on the marine environment, similar to those encountered with nuclear plants; and (3) impacts on scenic and natural areas. [E-f64]

Power Plants Traditionally Located Near the Coast. Though a variety of factors influence siting decisions, power plants have traditionally been located near the coast in order to make use of the free, abundant and nondepletable waters of the ocean and to be close to the major load centers of the State. [E-f63]

Few Coastal Sites Are Suitable for Nuclear Power Plants. Very few coastal sites are suitable for nuclear power plants, compared to a much larger number of potential inland sites. The radiation hazard potential of nuclear power plants requires that the utmost care be exercised to site them away from areas of seismic risk and from population concentrations. Few coastal areas meet these criteria, while the areas of the State that offer the least seismic risk are located inland. Studies done by the Rand Corporation and the Environmental Quality Laboratory of the California Institute of Technology concluded that only about 50 miles of coastline are suitable for nuclear power plants. Using less conservative assumptions about safety, a study conducted for the California Resources Agency concluded that 140 miles of coastline might be suitable, but no coastal areas were considered optimal from the standpoint of safety compared to other areas of the State. The California utilities are presently considering about 12 new coastal sites for power plants between now and the year 2000. [E-f65]

Inland Areas Offer Siting Options. There are many more potential nuclear power plant sites inland than on the coast that meet seismic safety and population concentration standards. The principal constraints on inland siting are the availability of adequate water for evaporative cooling towers and the need to dispose of blow down (water of high salinity concentrated by evaporation in the cooling tower). If sufficient cooling water is available, inland siting of nuclear power plants is both economically and technologically feasible; California utilities have proposed to build at some inland sites where sufficient freshwater supplies have already been allocated for cooling. Because of the importance of fresh water for agriculture and other uses, however, proposals to use additional fresh water for inland power plant cooling have been vigorously challenged. Much of the cooling water requirement inland could be met by reuse of municipal and agricultural wastewater. There may be competition between uses of wastewater for cooling and other beneficial purposes. New crop strains may be developed that could use what is now agricultural waste water. If the problem of nutrients, and other water quality problems, can be solved, the continued discharge of agricultural waste water into the Central Valley river system will reduce salt water penetration into the Delta. Widespread use of waste water for cooling would necessitate the construction of waste water collection, treatment, and transportation facilities and adequate restrictions on the disposal of blow down to the waters of the State. The cost of such facilities could be defrayed by the electric utilities themselves. Energy conservation measures, and use of more efficient reactors such as the HTGR coupled with dry or dry/spray cooling towers, would minimize the pressures for developing additional freshwater water sources. [E-f69]

Power Plant Once-Through Cooling Systems Adversely Impact the Marine Environment. The cooling systems of both fossil and nuclear power plants can have adverse environmental effects. Once-through cooling systems of the designs now used

in all existing coastal power plants (cooling water is used once and then discharged into the ocean or other water body) have multiple impacts on the marine environment and have potential for ecological damage caused by increased water temperatures, entrainment of marine life, and other effects as described in the Marine Environment Chapter. Redesign may reduce those impacts. [E-f67]

Evaporative Cooling Towers Will Eliminate Many Impacts on the Marine Environment.

Evaporative cooling towers consume 25-40,000 acre-feet of water per year per 1,000 Mw, and release heat directly to the atmosphere. Evaporative cooling towers may cause localized atmospheric changes (such as fogging) and drift (fallout of particles carried in water droplets) which under some conditions could be adverse; but these problems can be minimized or eliminated by modern engineering and strategic siting. Evaporative cooling towers using salt water are becoming more feasible as drift eliminators are improved, reducing the danger of contaminating the surrounding land area. Such towers would eliminate many of the concerns over impacts to the marine environment but would present the added problem of generating concentrated brine requiring disposal. [E-f67]

Viability of Dry Cooling Towers Not Established. Dry cooling towers, which operate like a car radiator, and dry/spray towers, which add an evaporative system in combination with dry towers, require little or no water but are larger and more expensive than evaporative towers. While dry cooling towers are technically feasible their commercial viability for use with large-scale power plants has not yet been established. [E-f67]

Cooling Towers Are Visually Obtrusive. All cooling towers are large structures, with resulting visual impacts, and they result in some efficiency penalties in the use of energy sources. [E-f67]

Reactor Types and Cooling Systems. Because of their lower efficiency in converting heat energy to electricity, nuclear light water reactors (LWRs) give off more waste heat than fossil fuel plants or other types of nuclear plants, and therefore require more cooling. The commercial feasibility of the high-temperature gas-cooled reactor (HTGR), which has a higher efficiency and therefore requires less cooling than the LWR, has now been demonstrated. HTGRs using dry/spray or dry cooling tower systems appear to be well adapted for use at inland sites where water availability for cooling is a significant problem. While there is some loss in energy efficiency in the use of cooling towers (dry towers are less energy-efficient than evaporative towers), this energy cost may be necessary to reduce depletion of other resources. [E-f68]

Underground Siting Is Feasible. Underground siting is technologically feasible, but is more expensive than aboveground siting. The environmental benefits of underground sites are considerable because of reduced visual impact, possible safety advantages afforded by some types of rock formations, and the potential for multiple use of the land. [E-f70]

Offshore Nuclear Plants Are Feasible But Potentially Hazardous. It now appears technologically feasible to construct offshore nuclear plants on floating platforms or artificial islands. However, this is much more likely to occur on the East Coast, where the wide, shallow continental shelf permits mooring and breakwater construction at some distance from shore, than off of California, where the shelf drops off abruptly into deep waters. Although offshore siting would significantly reduce land use conflicts and the environmental effects of cooling systems, serious questions remain regarding visual impacts if located

close to shore, the potential hazard to navigation, and the likelihood that a major accident resulting in release of radioactive materials would cause immediate contamination of the biosphere. Such hazards have not yet been adequately reviewed. Although two plants are being planned for sites offshore of New Jersey, no offshore plant has yet been licensed by the AEC. Siting concepts have also been developed for floating nuclear plants in manmade or dredged lagoons. [E-f71]

Fossil Fuel Plants Adversely Impact Air Quality. Fossil fuel plants in California are expected to be primarily oil-fired in the future because of the decreasing availability of natural gas. Oil-fired power plants represent large stationary sources of oxides of nitrogen and sulfur, and the problem of sulfur dioxide emissions will become particularly severe if low-sulfur fuels become unavailable. Though significant research and engineering efforts to reduce air pollutant emissions are continuing, fossil fuel plants at present do have a significant adverse impact on air quality, particularly in critical air areas where pollution levels are already exceeded, and in areas especially sensitive to air pollution, such as specialty agricultural and coastal recreation areas (see Coastal Land Environment chapter). [E-f66]

POLICIES

132. Coastal Agency Role in Power Plant Siting. The coastal agency should have permit authority over the land use and environmental aspects of power generation and transmission facilities proposed at sites located in whole or in part in the coastal zone, and should have the right to review and comment at all preliminary stages and on all aspects of proposals for such facilities presented to the State Energy Commission. Such permit authority should be concurrent with the permit authority of the State Energy Commission; it should also include permit authority over new power plants or expansions proposed for the coastal zone that have been exempted by law from the State Energy Commission permit requirement. As is presently suggested in the Warren-Alquist Energy Act, in conducting these various regulatory reviews, the coastal agency should work closely with the State Energy Commission in order to facilitate and expedite the administrative proceeding, including making its decision before the Energy Commission makes its final decision. [E-p13]

133. Coastal Agency Role in Ongoing Site Identification Process. The coastal agency should be granted a substantial ongoing role in State Energy Commission

statewide siting policy formulation and site identification processes. The role of the coastal agency in siting power plants should not be interpreted as an effort to exclude all power generation facilities from the coastal zone. Coastal siting decisions shall be determined by: the demonstrated need for such facilities measured within the context of a comprehensive conservation program; protection of inland as well as coastal resources; and full cooperation with all State, Regional, and local interests. [E-p14]

134. Siting and Design Criteria for Coastal Power Plants. New power plants should be approved in the coastal zone only when it can be demonstrated that the following siting and design criteria and standards can be met. [E-p15]

a. Energy Conservation and Peak Load Reduction Efforts. The applicant must demonstrate that energy conservation efforts, including concerted efforts by the applicant within its service area, cannot reasonably reduce base load and peaking requirements sufficiently to eliminate the need for the proposed facility.

b. Evaluate Alternative Inland Sites. The applicant must show that using obtainable inland sites or alternative technologies would have greater adverse environmental impacts than would be the case with a coastal site. Environmental impacts shall be those presently identifiable. In evaluating alternative sites and technologies, in addition to the factors included in the Warren-Alquist Energy Act, consideration shall be given to evaporative, dry and dry/spray, and salt water evaporative cooling towers, and the following potential water sources should be considered in evaluating the impact of providing cooling water at inland sites: (1) surplus freshwater supplies already allocated to power generation but not presently being used; (2) agricultural or municipal waste water; (3) freshwater supplies that can eventually be replaced by waste water; and (4) other freshwater supplies, if it is determined

that there is sufficient water available after the reasonable needs of other users are met so as not to deprive inland or coastal areas of fresh water needed for agricultural production. To assist in evaluating alternative sites the utility or utilities proposing the coastal site shall submit a comprehensive evaluation of reasonable alternative coastal and inland sites and generating technologies, including the environmental reasons for rejecting them in favor of the proposed site, sufficiently in advance of a desired decision that an adequate and independent analysis can be made. The primary responsibility for the identification of such alternative inland sites should rest with the State Energy Commission, and the identification or certification of such a site by that Commission demonstrates that such suitable alternative inland sites are available.

- c. Prefer Expansion Over New Plants. In the case of a proposal for a new coastal site, the applicant must show that the need for new capacity cannot or should not be met by plant expansion at an existing inland or coastal site which has been identified as suitable for expansion. The primary responsibility for the identification of such sites suitable for expansion should rest with the State Energy Commission, and the identification or certification of such a site by that Commission demonstrates that such suitable sites for expansion are available.
- d. Conflict with Coastal-Dependent Uses At or Near Site. The applicant must demonstrate that the proposed power plant and the land use restrictions required by the State Energy Commission on the surrounding area, as required by the Warren-Alquist Energy Act to protect public health and safety, will not conflict with other existing or planned coastal-dependent land uses at or near the site.
- e. Nuclear Plants Must Be in Seismically Safe Areas. In the case of a nuclear power plant, the applicant must show the proposed site is in

an area of minimum seismic hazard in comparison to alternative sites reasonably capable of serving the applicant's service area; the proposed plant is designed to safely withstand the effects of the most severe seismic activity thought possible in the site area; and the number of people and their distribution within the potential radiation hazard area meets AEC and State Energy Commission criteria, and the people can be readily evacuated in the event of an emergency.

- f. Use Least Environmentally Damaging Technologies. The applicant must show that the generation and cooling systems proposed are the least environmentally damaging technologies projected to be available at the time of scheduled construction. The cooling system technology employed shall meet the requirements of policy. Improvements in the cooling systems of existing facilities at the site may be weighed by the coastal agency in determining compliance with this subsection.
- g. No Degradation of Air Quality. In the case of a proposed new coal- or oil-fired electric generating plant at a new site, or a proposed plant expansion at an existing site, the applicant must demonstrate that the project will cause no significant degradation of air quality. The facilities shall be sited and designed to minimize the effects of pollutants for which there are designated Federal or State ambient air quality standards, and shall employ the least polluting technology to be available at the time the facilities are designed to go into operation. Such facilities shall not be built in areas of the coastal zone designated by the Air Resources Board as "critical air areas", or in areas where coastal resources (such as health resorts or agricultural lands) would be adversely affected, unless the coastal agency [E-p15g], in consultation with the State Energy Commission [I-p18a], determines that there is no

alternative inland or coastal location where siting would result in less environmental degradation. In no case shall expansion take place in a critical air area, or in an area where coastal resources (such as resort or agricultural areas) would be adversely affected, unless there would be a net decrease in generating system emission of pollutants for which national or state ambient air quality standards have been established. Normally this requirement will apply to each individual plant for which expansion is proposed, unless it can be demonstrated that the emissions from two or more near-by plants affect the same geographic area in an equivalent manner. If such a determination can be made, then the plants involved can be treated as one unit for the purposes of this policy. Reduction in emissions can be accomplished by modernization or retirement of existing facilities. [E-pl5g and L-pl8a] In addition, consideration should be given to utilizing plant equipment and design capable of easy conversion to such clean fuels as methanol, when they become available, or there should be findings of fact that methanol is not and will not be practical for use at the particular plant. [E-pl5RA]

- h. Minimize Environmental and Scenic Impacts. The applicant must design and locate the plant so it will be set back from the shoreline to avoid adverse visual impact on the shoreline and will minimize adverse environmental effects, including but not limited to effects on fish and wildlife and their habitats, and on scenic, agricultural, and other resources of the coastal zone. The plant should not be located in a highly scenic area as defined in Policy 48.
- i. Public Access Area Necessary. The applicant must show that a substantial area will be established for permanent public use and enjoyment of the coast. This may include a substantial dedication of land to the public. [E-pl5]

Regional Amplification:

South Coast: There are no sites in the Region presently suitable for new fossil fuel or nuclear power plants consistent with the objectives of the Act. Should new technologies become available, proposals for future power generating facilities at a new site in the South Coast Region shall demonstrate to the coastal agency that the facilities meet or exceed criteria, present or future, set down in all elements of the Plan concerning seismic, aesthetic, environmental, health, marine life, and safety matters.

The Commission shall consider proposals to construct new peaking facilities, such as a combined cycle facility or a plant with emissions similar to Scattergood No. 3., in dispersed locations in the coastal permit zone provided such proposals incorporate the least environmentally damaging technologies practical at the time of scheduled construction. Factors which should be considered are whether the individual facilities are less than 500 Mw in capacity; are located in industrial zones; are located more than three miles from an existing thermal plant site of more than 500 Mw capacity (to hold down the local effects of the emissions to the air and water); are designed to minimize their visual impact; use closed cycle cooling systems; and meet the prevailing APCD emissions standards and the prevailing water quality standards.

The Coastal agency shall consider all applications for expansion (e.g., by adding waste-heat boilers) or modernization of existing power plants provided that the total air pollutant emissions into the South Coast Air Basin are not increased, meet prevailing APCD emission standards, meet prevailing Water Quality Board discharge standards, have cooling systems redesigned to eliminate adverse marine impacts, best efforts are made to utilize waste water treatment plant effluents, and the new facilities are designed to minimize their visual impact.

The coastal agency shall expedite and approve all applications for new oil storage or transportation systems serving the Region's electric generating plants providing that the facilities incorporate the least environmentally damaging technologies practical at the time of the scheduled construction and that they are located on industrially zoned land. [E-pl5RA]

135. Remove Outmoded Plants from Beach Areas First. As alternative, less environmentally damaging technologies become widely available, so that some of the existing fossil fuel or nuclear generating facilities can be phased out and removed, priority shall be given to removal of those facilities that are in prime beach recreation areas. [E-pl5j]

PETROLEUM DEVELOPMENT

FINDINGS

California Has Potentially Recoverable Petroleum Resources. California has three general areas of petroleum production: onshore, State waters offshore, and Federal waters offshore. Estimates as to how much recoverable oil remains in these areas vary greatly, and depend on assumptions as to: (1) the size of known reservoirs and reservoirs thought to exist because of favorable conditions but not yet verified; and (2) the percentage of the oil in California reservoirs that might ultimately be recovered (average recovery efficiency). Using reservoir data from publications of the California Resources Agency and the National Petroleum Council, and assuming that California's historical average recovery efficiency of about 25 per cent prevails, the following figures describe California's estimated potentially recoverable petroleum resources—proven reserves plus 25 per cent of the petroleum thought to exist based on geologic data, but not yet discovered:

Onshore	10.0 billion barrels
Offshore	12.8 " "
Total California	22.8 " "

Using the same reservoir data, but assuming that increased oil prices and improved recovery technologies might result in an improved average recovery efficiency of up to 35 per cent, as some experts believe possible for California, the following figures describe the estimated potentially recoverable petroleum resources:

Onshore	19.8 billion barrels
Offshore	18.6 " "
Total California	37.4 " " [E-f72]

Offshore Areas Are Future Locations of Oil and Gas Production. California's onshore petroleum resources are still very substantial, though the largest reservoirs have probably been discovered and substantially developed already, and most of the remaining undiscovered onshore resource may lie in smaller pools and at greater depths than the reservoirs that historically have accounted for much of California's oil production. Increased onshore production will depend on improved secondary and tertiary recovery techniques, and on rising oil prices that encourage increased exploration, deeper drilling, and secondary and tertiary recovery from discovered reservoirs. The offshore resources now offer the least expensive option for rapid production of large volumes of oil in California. Much of the California offshore resource is close to the shoreline, and therefore production facilities may be highly visible from the coast. Most of the oil offshore of California is believed to lie beneath Federal submerged lands beyond California's jurisdiction, as much as 65 per cent of it at water depths of 1,500 feet or more. The extent and cost of developing the Federal offshore resource will not be completely known until exploratory drilling occurs. [E-f73]

Current Offshore Production Comes from State Leased Areas. Most present California offshore production comes from leases in the Santa Barbara Channel and offshore Wilmington and Huntington Beach reservoirs. According to 1971 data, there are over 1,800 actual producing wells on State-owned submerged lands

between Point Conception and Huntington Beach. The State receives lease payments and royalties from any petroleum production on its submerged lands, which are managed by the State Lands Commission. The vast majority of the State's submerged lands have been made State petroleum resource sanctuaries in which no petroleum recovery activities are allowed. Laws creating additional petroleum sanctuaries have been proposed in the California Legislature and the U.S. Congress. Coastal cities (e.g., Long Beach) also hold several leases and receive a portion of the petroleum revenues; the State Lands Division maintains operating authority on the leases. [E-f74]

Moratorium Placed on New Offshore Drilling in State Waters. In 1969, following the blowout on a platform in Federal waters off Santa Barbara, the State Lands Commission placed a moratorium on new drilling offshore in State waters. In December 1973 the State Lands Commission voted to permit drilling of new wells from already-built platforms on existing leases, subject to approval on a lease-by-lease basis. In late 1974 the Lands Commission granted approvals to several oil companies for such drilling, but then reversed these decisions in early 1975 pending further evaluation. [E-f74]

Federal Lease-Sale of Southern California Areas Scheduled for July 1975. The Department of the Interior has called for lease proposals from oil companies for petroleum drilling in huge areas of submerged lands offshore of Los Angeles County beyond the three-mile State jurisdiction, for lease proposals for large areas off central and northern California at a later date, and for increased drilling on existing Federal leases in the Santa Barbara Channel. If the Department of the Interior decides to proceed with its lease-sale of the southern California area, the sale will occur about July 1975. [E-f75]

New Proposals for Federal Government to Sponsor Exploration. The Chairman of the State Lands Commission and some members of the California congressional delegation are presently proposing that the Federal government sponsor all exploratory drilling on the Outer Continental Shelf (OCS), either by contracting with private companies to perform the work, or by developing a governmental capability to do such exploration. This proposal would permit the government full knowledge of the extent of the OCS resource and the value of specific OCS areas prior to any leasing to private companies for development. [new]

California Has No Control over Federal Offshore Drilling. Although these Federal activities may affect California's ocean water quality, marine life, and scenic values, could possibly deplete oil reservoirs extending under adjacent State submerged lands, and may directly lead to significant onshore developments of refineries, tanker terminals, storage tanks, and pipelines requiring permits from the Coastal Commission, California has no direct control over the Federal plans at this time. [E-f75]

Deficiencies in Federal Offshore Regulation and Supervision Are Being Remedied. In the past, Federal regulations governing drilling and production procedures on Federal submerged lands, including requirements for depth of casing for blow-out preventers and crew training and supervision, have been less stringent than California Division of Oil and Gas regulations governing operations on State submerged lands, where there have been no significant spills resulting from offshore oil and gas operations. Deficiencies in Federal regulations led directly to the well blow-out in Federal waters off Santa Barbara in 1969. Federal regulations, procedures, and regulatory staff are now being greatly upgraded. It is expected that when revision of Federal regulations for the

Pacific Coast area are completed, they will be in substantial conformance with those of the State. [E-f76]

Petroleum Production Is Declining. The leasing of lands, exploration, drilling, and production of petroleum is an expensive and risky process. Offshore exploration and production operations are generally much more expensive than onshore activities. Exploration for petroleum has generally decreased in California and nationwide, however, over the past 20 years. The success rate of finding and completing new petroleum fields has also steadily declined. Petroleum shortages, increased costs of extraction, and the need for technological research continually push the price of petroleum upward, which in turn should allow increased exploration and research toward technological advances. Over the first six months of 1974 exploratory and drilling activity have increased. [E-f80]

Regional Amplification

South Coast: Production of petroleum in the Los Angeles basin peaked in 1969; the same is true for production in the coastal area of the Basin. Exploratory drilling has been at historically low levels in both the onshore and offshore portions of the coastal area. Oil production and development drilling are both likely to continue to decline, although the increases in crude oil prices since 1973 may reduce the production decline rate below the approximately 10 per cent per year rate normally experienced by California oil wells. It is projected that the average rate of decline in California production shipped to Los Angeles/Long Beach area refineries will be four per cent per year to 1985. [E-f80RA]

California Has a Low Recovery Rate. The nationwide recovery efficiency of oil has steadily increased to approximately 31 per cent. California's 25 per cent recovery efficiency lags behind other major oil and gas producing regions due to: (1) generally high viscosity of much of California's oil, and the relatively low pressures affecting reservoir drive properties of associated natural gases and water; (2) complex geologic formations holding the petroleum, with many reservoir problems; and, to a lesser degree (3) lack of State regulation that might maximize ultimate recovery of oil and gas by regulating well completion and production practices. [E-f77]

California Has Less Stringent Regulation over Petroleum Development. Completion and production practices in many oil-producing States, including Alaska, Louisiana, Texas, and Wyoming, are regulated by a State agency (the Canadian province of Alberta also regulates petroleum development). California's laws do not provide for actual regulation of completion and production practices by the Division of Oil and Gas, and the California petroleum industry is allowed very wide discretion in production rates and such practices as simultaneous production from many pools, and optional ratios of gas/oil production, which in turn can lead to low recovery efficiencies. Some other states also have requirements for public disclosure of exploratory data within some period of time after filing with the state regulatory agency, to increase geologic investigations, stimulate exploration, promote a more competitive industry, and increase oil production; and the Department of the Interior has proposed regulations for OCS lease purchasers that would require public disclosure of geological and geophysical data following the purchase, to be made public within six months. California has no such disclosure requirement. [E-f78]

Secondary and Tertiary Production Methods Will Improve Petroleum Recovery.

Secondary and tertiary production methods offer the promise of increased efficiency in recovering oil and gas. California has benefited from secondary recovery innovations and their applications. About 15 per cent of California's present oil production comes from secondary recovery operations. In some reservoirs, very little primary production is possible, but secondary recovery may increase production after primary recovery by 10-50 per cent of the original oil in place, and tertiary recovery may offer the potential for a total recovery of 30-70 per cent. Substantial improvements in recovery efficiency will require improved technology, greater capital investments, higher well maintenance costs, and a higher price for refined products. With a greatly increased effort at secondary and tertiary methods average recovery efficiency for California may ultimately go as high as 35-40 per cent of original oil in place. [E-f79]

Existing Wells Will Provide Increased Production; Consolidation of Drilling Sites Is Desirable.

Increased primary, secondary, and tertiary production from existing wells will entail substantially fewer new developments and land use conflicts than exploration and drilling for virgin reservoirs, onshore or offshore. Unitization (development of a reservoir as a single unit) and consolidation concentrates activity within smaller areas than does separate development by several petroleum companies. Unitization is particularly desirable offshore—economically, environmentally, and aesthetically. [E-f81]

Offshore Oil Structures Are Visually Prominent. Offshore petroleum operations are usually conducted from manmade platforms above the water's surface. Exploratory drilling and some production drilling are primarily accomplished from mobile platforms, whereas most production of oil and gas is controlled from fixed platforms. It is very difficult to make the judgment that offshore oil drilling and production platforms are intrinsically at variance with the objectives of the Coastal Act. There has been substantial objection by some segments of the public to their use, based primarily on aesthetic grounds and concern for navigational safety. Because of their size and the elevation of coastal lands, these platforms can be seen from the coast even when located at great distances (12-20 miles) from the shoreline; they are particularly prominent when located near the coast. The existing designs apparently have large margin for improvement. Some members of the public note with approval their beneficial effects on sport fishing. The deepest platform production in the world presently is in 420 feet. Exxon Company U.S.A. plans to construct and operate a fixed platform in 850 feet of water in the Santa Barbara Channel. [E-f82 and RA]

Platforms and Islands Offer Multiple Public Uses. Offshore oil drilling facilities, whether located on artificial islands or platforms, can provide public uses other than that of extracting oil. Under certain safety and aesthetic conditions, additional functions could be provided. This would likely require some engineering adjustments within sound principles of industrial and marine safety on the platforms. Additional functions, which may be appropriate for some installations, are scientific and educational accommodations, such as a physical oceanography research and education lab; general public accommodations for the observation of drilling operations; government installations (Coast Guard, weather service); aquafarming and mariculture operations; and platform self-sustaining power equipment. [E-f82RA]

Subsea Completion and Submerged Production Systems Reduce Costs and Aesthetic Impacts. As of mid-1974, approximately 40 individual wells in shallow water

on State-lands in the Santa Barbara Channel area had been completed entirely underwater rather than from permanent platforms, by using "subsea completion systems." Such systems still require support facilities on permanent platforms or onshore, but permit reduction in the number of platforms required for the development of the offshore resource. More sophisticated "submerged production systems," which would permit clustering of numerous wells completed subsea around a single subsea center that would in turn pump the oil and gas to facilities on platforms or onshore, would still further reduce the need for platforms. This would reduce both the aesthetic impacts of offshore development and the great expense of constructing platforms in deep waters. Actual experience with subsea completions and submerged production systems in deep water is still extremely limited. The difficulties involved in servicing or repairing such systems mean increased environmental risk. Such facilities need to be tested extensively by industry under operational conditions, with full observation afforded to appropriate government agencies, before they are utilized in deep water offshore activities. [E-f83]

Offshore Drilling Is More Hazardous than Onshore. Oil and gas leaks in offshore drilling or production are statistically rare, and steadily improving offshore drilling technology should still further reduce the incidence of occurrence. However, the draft programmatic Environmental Impact Statement prepared by the Bureau of Land Management for the nationwide accelerated Federal offshore leasing program noted that major spills associated with OCS development are inevitable. The California offshore environment is relatively mild compared to the environment in offshore drilling areas elsewhere in the world, such as the North Sea and the Gulf of Alaska, and therefore presents somewhat reduced environmental risks. Nevertheless, even in California offshore drilling generally involves greater environmental hazards than onshore drilling for several reasons: (1) People are at a logistical disadvantage in working in the offshore environment, whether on the surface or underwater. Response time to crisis is slower than onshore, and the ability to maintain equipment and receive supplies is constrained. (2) Offshore facilities are subjected to more danger, including storms, vessel collisions, seawater corrosion, low water temperature problems, water currents, seismic activity, and tsunami (seismic sea waves). Platforms can be designed and constructed to withstand known Pacific Coast phenomena. (3) Leaks of oil and gas are more quickly diffused, and more difficult to plug. [E-f84]

Basic Spill Cleanup Methods Help Minimize Environmental Damage. If an oil spill should occur, the substances must be contained and recovered quickly to minimize environmental damage. Present containment methods utilize floating booms or pneumatic curtains which confine the oil. Recovery methods include absorbing materials (e.g., straw), suction devices, adhesive materials to remove the oil from seawater, and skimming mechanisms that remove oil from water. Oil may also be dispersed into the water column by the addition of chemicals, collected with gelling substances, forced to the sea floor by combining with sinking agents, or burned with combustion fluids. Use of sinking and burning agents are generally forbidden by the California Department of Fish and Game. [E-f85]

Spill Containment and Cleanup Methods Are Still Inadequate. Since 1969 larger amounts of money have been spent on improving oil spill prevention and containment programs and for cleanup equipment. Although the technology for containment and recovery of offshore oil spills has improved since the Santa Barbara spill, no system is likely to be completely effective. Using pre-

sently available equipment, oil containment and recovery can be reasonably effective in calm waters; but moderate to stormy conditions (winds of 20 or more knots and wave heights over five feet) will seriously hinder deployment of equipment, and will spread the spill regardless of containment attempts. Such conditions will also act to disperse and degrade the spill. Most oil spill contingency plans, including the National Oil Spill Contingency Plan implemented under the guidance of the Coast Guard, and the State of California Oil Spill Contingency Plan, have been tested under simulated conditions but have not yet been proven under actual crisis situation. [E-f86] (For further findings on oil spills and spill liability, as well as Coastal Plan policy, see Marine Environment section.)

Oil Field Brines Can Be Disposed of by ReInjection into Oil Producing Zones. Inadequately treated oil field brines released at sea are highly polluting. In many instances, these brines can practically be disposed of by reinjecting them under pressure into oil producing zones. In addition to protecting water quality and decreasing odors associated with oil production, this practice can frequently help increase oil recovery from already-developed reservoirs. The Water Quality Control Board presently issues discharge requirements and the Division of Oil and Gas regulates any reinjection of brines. [E-f90]

Offshore Production Will Encourage Onshore Development. Offshore petroleum production may encourage greater industrialization in certain areas of the coastal zone, will increase water and land transportation, and will necessitate construction of oil and gas pipelines and storage facilities. Offshore production off California could reduce the need for additional tanker terminal capacity along the coast. [E-f89]

POLICIES

136. Need for Offshore Development Should Be Clearly Determined. New offshore oil and gas development of State or Federal lands shall be permitted only after: (1) development of the Outer Continental Shelf (OCS) off California has been clearly identified as an integral and priority part of a comprehensive, balanced national energy conservation and development program that gives consideration to full-scale energy conservation programs and to short-term and long-term resource availability [E-pl6b]; or (2) a comprehensive analysis has determined the need for California offshore production in light of the anticipated inflow to California and PAD V of oil and other forms of energy from all other sources, including onshore oil production, Alaska North Slope oil and gas production, production in other regions of Alaska, foreign oil and gas imports, and in view of California's projected capacities to refine and store the anticipated inflow

of oil from sources other than new offshore production [E-pl6a]; and (3) the coastal agency determines that the impacts on onshore resources and possible impacts on the coastal zone marine resources as a result of OCS development are acceptable according to the standards set forth in the Coastal Plan. [E-pl6c]

Regional Amplification

Central Coast: The current prohibition of oil exploration and drilling in the State tidelands of the Central Coast Region should be retained unless overriding national need is demonstrated. [E-pl6RA]

137. Require Full Evaluation of Offshore Drilling Proposals. Applicants for drilling permits in State offshore lands shall be required to submit to the State Lands Commission, State Energy Commission, and coastal agency one-, five-, and ten-year plans for exploration, production, and all related onshore and offshore development (including platforms, submerged production systems, pipelines, separation and storage facilities, and refineries) that might follow if drilling is successful. To the extent not already provided in the required California Environmental Impact Report, such development plans shall include the economic, environmental, and aesthetic impact on the immediate area and the entire coastal zone of offshore and onshore facilities and operations, including all transportation and distribution facilities, and all measures to mitigate any environmental hazards of onshore and offshore activities, including alternatives to the anticipated facilities, programs for containment and recovery of potential oil spills, and improvements in marine traffic lanes, navigational equipment, and traffic control. The adequacy of such measures shall be taken into account in approving or disapproving the application. Plans shall also include discussion of petroleum supply and demand as specified in Policy 136. [E-p17] All the facilities and accommodations required in the lease shall be completed on a predetermined schedule specified in the lease. [E-p21RA] Plans shall be recognized as being dependent upon the results of exploratory drilling and changing techniques, and, as such, flexible, but changes

in such plans shall be justified by the applicant with full disclosure of supporting data. [E-p17]

138. Allow Offshore Drilling Only Where Safe. Offshore drilling and production shall be permitted only where it can be demonstrated that: (1) the most advanced state-of-the-art drilling and production technology is utilized; (2) the geologic characteristics of the area have been adequately investigated and are consistent with safe drilling and production; and (3) the proposed well sites are the least environmentally hazardous and aesthetically disruptive sites feasible. [E-p18]

139. Consolidate Drilling, Production, and Processing Sites. All petroleum-related development and operations shall be consolidated (i.e., drilling, production, separation facilities, and support sites shall be unitized—developed and operated by a single company or group of companies for the benefit of all interested companies—or shall be shared) to the maximum extent feasible, unless it can be shown that unitization or consolidation will not reduce the number of facilities, or significantly reduce the number of producing wells or support facilities required to produce the reservoir economically and with minimal environmental impacts. For offshore facilities, unitization negotiations shall be entered into by all operators holding State leases covering one producing structure, and unitization of a new offshore field shall be carried out before commercial production is initiated. The unitization or consolidation requirements shall apply to all types of offshore platforms, submerged production systems, pipelines, storage facilities, separation facilities, and equipment and rights-of-way for transporting petroleum to refineries, whenever technically and economically feasible, and where legally permissible. [E-p19]

140. Use Submerged Completion and Production Systems Where Feasible and Environmentally Safe. Subsea completion of wells and submerged production systems shall be used where environmentally safe, as demonstrated through adequate testing of equipment, through adequate testing of equipment by industry, observed by the appropriate government agencies, and where technically and economically feasible. In those areas where oil platforms or islands would have a substantial adverse environmental effect, including degradation of aesthetic values, no offshore drilling should be permitted unless and until subsea completions or submerged production systems are demonstrated to be environmentally safe. [E-p20]

141. Platforms Preferred Over Islands; Minimize Impact of Platforms. Where subsea drilling, completion, or production is found to be technically or economically infeasible, or environmentally unsafe, thereby making platforms or islands necessary to development of the resource; or where platforms are necessary to service subsea completions, or submerged production systems, the following policies shall apply. [E-p21]

- a. Prefer Platforms. Platforms shall be preferred over islands wherever safety considerations permit.
- b. Minimize Number of Platforms. The number of offshore platforms shall be minimized by using each platform to drill as many wells, and/or to service as many subsea completion and production systems, as is technically and economically feasible, and environmentally safe.
- c. Review Design of Facilities. The design and aesthetics of the platforms or islands shall be carefully reviewed by the coastal agency and by the immediately landward local governments, and shall be consistent with the general design criteria of the Coastal Plan.
- d. Allow Recreation in Waters Off Platforms. The waters surrounding new platforms or islands shall be open to sport fishing, diving, and boating, consistent with boating safety rules and practices.

- e. Consider Multi-Purpose Public Area. Prior to actual construction of an artificial island, if an island is determined to be needed, full consideration shall be given to installation of multi-purpose public interest uses, including but not limited to small-boat landing piers and amenity public recreation areas, scientific and educational facilities (e.g., marine biology, oceanography and meteorology research stations), public tours of drilling operations, Coast Guard or U.S. Weather Service station, or aquaculture operations, consistent with public safety and other policies of the Coastal Plan. If the State Lands Commission and the coastal agency find such multiple uses to be technically and economically feasible, they shall be required in the terms of the lease (or subsequently in the construction permit if not determined at that time).
- f. Prevent Polluting Runoff. All water that contacts working surfaces of oil islands (including rain runoff) shall be contained and not allowed to drain in an untreated state into the ocean. Treatment shall be adequate to remove essentially all petroleum or chemical residues from the estimated maximum amounts of runoff water. [E-p21]

142. Minimize Impact of Onshore Facilities. All onshore drilling, production, and onshore support facilities for offshore operations, including separation plants, pipelines, terminals and storage facilities, shall be designed and located to minimize their environmental impacts consistent with recovery of the resource. Prior to putting up leases for bidding, the State Lands Commission should submit its lease provisions relating to minimizing the environmental impact of anticipated associated facilities to the coastal agency. Where such development would result in substantial adverse impacts to the resources of the coastal zone, it shall be permitted only upon a demonstration that there is a need for the project, as specified in Policy 136

that alternatives would have a greater adverse environmental impact, and that there is little likelihood of improvement in technology that would substantially reduce such impacts in the immediate future (e.g., new technology for carrying out subsea production, oil and gas separation, storage, and natural gas liquefaction that might reduce the need for large onshore facilities). [E-p22]

143. Increase Oil Recovery Efficiency. The California Legislature should: (1) enact legislation to require the California Division of Oil and Gas to regulate petroleum completion and production for individual wells, including setting maximum efficient rates of production, as analogous government agencies do in other major oil producing states; and (2) adopt a resolution calling for the Federal Energy Administration to encourage primary, secondary, and tertiary production from existing wells. [E-p24]

144. Disclose Exploration and Production Data. The Legislature should enact legislation requiring that all original exploratory and production data from surveys or drilling of wells (including all logs, complete well histories, cores, drilling cutting, water samples, chemical analyses, pressure and temperature measurements, etc.) be submitted within 60 days after finishing to the Division of Oil and Gas, with appropriate assurances of strict confidentiality, and shall be made public information one year after submittal, except that where such public disclosure would result in severe inequity to a well operator, year-to-year extensions of confidentiality might be granted by the Division of Oil and Gas. [E-p25]

145. Protection Against Any Adverse Impact of Federal OCS Development. The Coastal Commission or the coastal agency, the California Legislature, the California congressional delegation, the State Lands Commission, the Division of Oil and Gas, and all other concerned agencies should seek agreement from

the Department of Interior and other Federal authorities that Federal Outer Continental Shelf (OCS) leases will be approved by the Department of Interior only if the following conditions are met:

- a. Demonstration of Need. Need for Federal OCS development off California must be clearly determined as required in Policy 136. [E-p27]
- b. Full consideration should be given to proposals that the Federal government sponsor all exploratory drilling on the OCS, either by contracting with private companies to perform the work, or by developing a governmental capability to do such drilling, in order to acquire full data about the OCS resource and its value prior to any leasing to private companies. [new]
- c. Provide for Public Review. Opportunities for effective review of proposed OCS development plans must be provided for the general public, interested units of State, regional, and local government, and other segments of the communities most immediately effected by OCS development activities.
- d. Develop and Disclose Long-Term Plans. One-, five-, and ten-year plans for petroleum production and all related development as described above in Policy 137, and their impacts on the California coast, should be fully developed and disclosed.
- e. Prevent Drainage of State Petroleum Sanctuaries. The leases in question should be clearly separated from the State petroleum sanctuaries to prevent drainage of oil and gas reservoirs that may lie partially on State submerged lands.
- f. Establish Stringent Safety Standards. Petroleum production under Federal jurisdiction off the California coast should be made subject to safety standards at least as stringent as those for production on State-regulated offshore areas (i.e., those contained in the California Division of Oil and Gas regulations and the manual of procedures of the State Lands Division).

- g. Evaluate Unitization or Consolidation Possibilities. The possibility of unitization or consolidation of all operations and facilities should be fully evaluated and required where feasible, as described in Policy 139.
- h. Consider Use of Subsea Systems. The possibility of use of submerged drilling, completion, and production systems that have been adequately tested to meet rigid environmental safety standards should be fully evaluated as a partial alternative to platforms.
- i. Some OCS Revenues Should Go to States. The Federal government should agree to provide moneys to California (and to other coastal states) prior to leasing, with the funds to be reimbursed either through a fee related to production volumes, or by making available a portion of its revenues from OCS lease sales or production royalties, or by granting funds from some other source, to assist the State and local governments in planning for and overcoming or mitigating any adverse impact of this production (e.g., planning for transportation terminals, additional refineries, pipelines and storage areas, and other support facilities in a way that minimizes environmental impacts), and to assist the State and local governments to purchase land for recreation or provide other amenities along the coast to help offset the impact of OCS development.
- j. Designate Sanctuaries in Certain Areas. Sites and tracts should be designated as sanctuaries (1) if they are unusually subject to the risk of oil spills due to geological seismic disturbance; or (2) if they offer unusual coastal aesthetic assets or the local economy is particularly dependent upon the protection of coastal aesthetic assets. Portions of the Santa Barbara Channel, Monterey Bay, and Santa Monica Bay would appear to be candidates for sanctuary status. [E-p27]
- k. Compatibility with Coastal Plan Policies. Federal OCS development and related activities should be compatible with policies set forth in the Coastal Plan.

146. Prevent Subsidence; Reinject Oil Field Brines. Liquid and gas extraction projects that could cause or contribute to subsidence hazard (where there is a potential for significant present or future property damage) shall not be permitted and existing operations stopped unless it is determined that there is no reasonable alternative. In such cases, the best available techniques for minimizing or preventing land subsidence shall be utilized. [G-p9]

Lease or unit operators constructing new facilities shall reinject all oil field brines into oil producing zones unless injection into other subsurface zones will reduce environmental risks. Exceptions to reinjection will be granted only after submission to the coastal agency of detailed plans adequately providing for the elimination of petroleum odors and all potential fresh water or ocean water quality problems. [E-p23] Monitoring programs to record land surface and nearshore ocean floor movements shall be continued in all areas of subsidence problems and shall be initiated in locations of new large-scale fluid extraction on land or nearshore before operations begin. Such monitoring shall continue during and after liquid and gas extraction operations until surface conditions have stabilized. Costs of monitoring and mitigation programs shall be borne by liquid and gas extraction operations, overseen by an appropriate State agency. [G-p9]

REFINERIES

FINDINGS

Existing Refineries Are Near Cities and the Coast. The 34 existing California oil refineries have a total capacity of 1.8 million barrels per day (b/d). Of these refineries, 15 are in the Los Angeles area (1,012,000 b/d), 6 in the San Francisco Bay Area (625,000 b/d), 9 in Bakersfield (141,000 b/d), and the remaining 4 at scattered sites (30,000 b/d). These sites were chosen by the oil companies primarily to accommodate the large market areas (major cities), but also, in part, to be close to supplies of crude oil (both inland and water-borne). Most of the Los Angeles and San Francisco plants refine crude produced in-State as well as foreign crude brought in by tanker. No State agency oversees the siting of refineries in order to maximize the efficient and safe location of facilities, and minimize the environmental impacts. [E-f105]

Three Refinery Expansions Are Proposed in the Coastal Zone. There are 11 projects for additional refinery capacity proposed in California. Only three of these are at sites in the coastal zone. The one major coastal zone site expansion—El Segundo—was approved by the Coastal Commission in June 1974. The two other projects are a 100,000 b/d new refinery proposed near Carlsbad, set back one to two miles from the coast and designed primarily to provide low sulfur fuel oil to San Diego Gas and Electric's Encina power plant, and a 60,000 b/d new refinery proposed near Ventura. [E-f111]

Refineries Emit Air Pollutants. Petroleum refining produces emissions of particulates, sulfur oxides, nitrogen oxides, olefins (reactive hydrocarbons), aldehydes, ammonia, hydrogen sulfide, and carbon monoxide. The type of emissions and emission levels from any particular refining operation will depend on the type of process units the refinery employs, among many other variables. Refinery air pollution emissions have been decreased in modern refineries by improved combustion technology, better operating procedures, and more conscientious control efforts, but they have not been eliminated. [E-f108]

Existing Refineries Normally Do Not Exceed Ambient or Stationary Source Standards For Most Types of Pollutants. In administering the Federal Clean Air Act, the Environmental Protection Agency, State agencies (Air Resources Board) and local Air Pollution Control Districts (APCDs) control the allowable levels of some pollutants from single stationary sources (such as refineries) and also set standards for ambient air quality. In California, existing refineries generally do not exceed ambient or stationary source standards for emissions of sulfur oxides, nitrogen oxides, particulates, and carbon monoxides during normal operations. Under the Clean Air Act, major new stationary sources are to be prohibited if they would interfere with the attainment or maintenance of ambient air quality standards. It is possible that a new refinery might be capable of meeting the stationary source emission standards, but not be permitted because it would interfere with attainment of national ambient air standards or with other more rigorous air quality goals. [E-f108] (See also the Coastal Land Environment section on Air Quality regarding current air quality degradation standards.)

Hydrocarbon Emissions Are of Special Concern. Of particular concern are refinery hydrocarbon emissions. Hydrocarbons combine with oxidants and sunlight in a photochemical reaction to produce photochemical oxidants. The Federal ambient hydrocarbon standards are a guideline to help achieve the ambient photochemical oxidant standard. At least one major study, however, disputed by the oil industry, questions the technological ability of any refinery to meet the Federal standards for hydrocarbon emissions, and cites the need for further study of this critical issue. [E-f108]

Two recent studies by the National Academy of Sciences and the University of Southern California School of Medicine suggest a relationship between hydrocarbons emitted by certain refinery processes and a higher incidence of lung cancer mortality in populations exposed to the hydrocarbon in question. These studies are still incomplete, and the conclusions are admittedly extremely tentative. Refineries can, however, contribute to the deterioration of the overall quality of an air basin, which in turn can cause eye and lung irritation and aggravate respiratory and cardiac ailments. There are presently no comprehensive State or local regulations governing the residential use of land within the "health-effect distance" range of refineries.

Refinery Pollution Impacts Elsewhere. Refineries can also have adverse effects on agricultural activities and flora generally, and on property. [E-f109]
(See Coastal Land Environment section on Air Quality.)

Refinery Emissions May Be Offset by Reduced Emissions From Its Products.

While even the most modern refineries will produce some emissions, the production of "cleaner" petroleum products can result in a net reduction of air pollutant emissions in an area. This can occur when these "cleaner" products replace more highly polluting products presently in use. Maximum restorative benefit to an area that already has air quality problems can be achieved by siting the refinery outside of the problem air area, while utilizing the cleaner products within the area. [E-f108]

California Lacks Adequate Desulfurization Refining Capacity. One of the beneficial products that refineries can contribute is low sulfur fuel oil. Low sulfur fuels or natural gas must be burned in fossil fuel-powered electricity-generating power plants in order to meet air pollution emission standards. The demand for low sulfur fuels has increased greatly in the past two years with the decrease in availability of natural gas for use in power plants and industry. California presently lacks sufficient desulfurization refining capacity to meet this demand. California has therefore had to rely on importing large volumes of low sulfur crude oil and residual fuel oil, both of which are expensive and hard to obtain on the world market.

Additional Desulfurization Capacity Offers Advantages. If desulfurization capacity is constructed in California, refinery costs will be significantly increased. The import requirements for hard-to-get low sulfur crude oil, however, will decrease, and although the total volume of crude oil needed in California will not be reduced, the ability to utilize high sulfur fuel oil will provide greater supply flexibility and reduce crude costs. New desulfurization refining capacity is now under construction at the Richmond and El Segundo refineries (Standard Oil of California); and a new refinery proposed near Carlsbad (Macario Independent Refinery) would also have direct residual fuel oil desulfurization capability. California could benefit from additional refinery desulfurization capability. [E-f106]

Refinery Siting Is a Complex Problem. The degree to which states can allow air quality to be "degraded," even if it would still meet Federal ambient air quality standards, is presently being contested in courts. Further refinery capacity may be forced to move outside critical air basins if it interferes with attainment of air quality goals; but, on the other hand, refineries may not be permitted to "significantly" deteriorate the air quality of pristine areas. Air quality regulations and their implementation are extremely controversial, and are presently still in a state of flux. [E-f108]

Physical Siting Criteria For Refineries. Although small refineries can be built on tracts no larger than 200-300 acres in size, major new refineries typically require as much as 500-1,500 acres of land, including a surrounding landscaped buffer area. They require municipal water supplies for cooling, and treatment facilities adequate to handle large waste volumes. They are large-scale, visually intrusive industrial developments. Even the most modern refineries may occasionally emit noise and odors, and represent significant single sources of air pollutants. [E-f111]

Remote Siting of Refineries Is Feasible With an Increase in Product Costs. Primarily because refined products must be kept segregated during shipping and

storage operations, the transportation of refined products is more costly than transportation of crude oil; therefore, proximity of refinery sites to market areas is a greater industry priority in siting decisions than proximity to tanker terminals. For example, Standard Oil of California is willing to pipe crude oil a distance of 277 miles from its proposed Estero Bay superport to its Richmond refinery. Thus, they are not "coastal-dependent." Added transportation costs resulting from remote siting would presumably be passed on to consumers in the form of increase product prices. Other factors that must be addressed in remote siting considerations are the availability of properly zoned land, pipeline easements, water supply for cooling, and net energy and materials requirements. Siting of refineries away from market areas (in California, away from critical air areas) is feasible, and would help restore critical air areas; but it would raise the cost of refined products by as much as one to three cents per gallon. [E-f107,111]

Refineries Have Impacts on Nearby Developments. Refineries can encourage the nearby construction of petroleum-associated industries (petrochemical, plastics), which can lead to rapid industrial growth and increased population. In the short-term, refineries enlarge the tax base of the host community; in the longer term, they very substantially increase municipal services requirements, and may ultimately lead to a decline in residential and commercial property values. Many of these potential impacts can be mitigated by rigorous planning and new technology; but they cannot be eliminated. [E-f111]

Safety Considerations in Refinery Siting. Refineries have a large fire and explosion potential. State and Federal regulations and the considerable efforts of refinery owners can minimize this potential. Optimal safety considerations require siting refineries away from seismic areas, and separating them from surrounding populations by a buffer area. [E-f111]

Water Quality and Solid Waste Disposal Affect Refinery Siting. The EPA has identified a wide range of water pollutants which are emitted by oil refineries in either their process or cooling water streams. At presently used levels of treatment, additional oil refinery capacity discharging wastes to the marine environment would degrade the waters of the coastal zone to a degree not consistent with the objectives of the Coastal Act. Modern water treatment technologies can reduce these emissions, and once-through cooling systems, sometimes used to dilute pollutants to meet discharge standards, can be eliminated. Removal of pollutants from the air and water discharges from refinery systems will result in accumulations of solid or semi-solid waste products, for which proper disposal must be provided. [E-f112]

POLICIES

147. Minimize Refinery Construction Along the Coast. New refineries or expansions of existing refineries shall be permitted in the coastal zone only when it can be demonstrated that: (1) there is a public need for such facilities, the determination of which is coordinated with the determinations of need for OCS production in Policy 145 and tanker terminals in Policy 155;

(2) the refined products will significantly assist in reducing air pollution by users of the product; (3) there is no less environmentally damaging site available; (4) the project is designed and located to minimize any adverse environmental effects, including provision of a sufficient buffer zone to minimize impacts on surrounding property; and (5) the proposed project is consistent with all other policies of the Coastal Plan. [E-p34] In no event shall a new oil refinery be permitted in a highly scenic area (as defined in Policy 48), on any of the Channel Islands, or in or near special marine and land habitat areas. [E-p35a]

148. Refinery Siting Authority. The coastal agency should coordinate with other agencies such as the State Energy Commission in any future refinery siting studies and policy development. [E-p34] If the State Energy Commission is given authority for statewide refinery siting, it shall make the determination as to availability of preferred alternative sites inland, and the coastal agency should be given concurrent jurisdiction over alternative sites in the coastal zone. In the absence of Energy Commission refinery siting authority, the coastal agency shall make the determination. [E-p34d]

149. Restrict Refineries in Critical Air Areas. No new refineries shall be permitted in critical air areas (as defined by the Air Resources Board) unless it can be shown that their negative impacts upon water quality and air quality are more than fully offset by reductions in the insufficiently treated wastewater discharge and in gaseous emissions in the area by the users of the fuels. [E-p35a] Existing refineries in critical air areas shall be permitted to expand capacity only if (1) the best available technology for reducing emissions is utilized and (2) total site emission levels, and site levels for each emission type for which national or State ambient air quality standards have been established (i.e., hydrocarbons, sulfur dioxide, oxides of nitrogen, carbon monoxide, and particulates), do not increase. [E-p35b]

150. Site and Design Refineries to Protect Public Safety. Refineries shall be sited and designed to minimize exposure of surrounding property and population to the consequences of possible large fires and explosions, and shall be sited away from areas of substantial seismic risk. [E-p36]

151. Encourage Construction of Desulfurization and Methanol Capacity. Applicants for additional refinery capacity in California (but not necessarily in the coastal zone) should maximize the addition of desulfurization capacity designed to produce low sulfur fuels, unless the Energy Commission determines some greater public need outweighs the advantages of such a requirement. [E-p37]
Consideration should be also given to providing for the production and storage of methanol. [E-p12RA]

152. Minimize Use of Once-Through Cooling. New or expanded refineries should minimize the need for once-through cooling by using air-cooling to the maximum extent feasible, and by using treated waste waters from in-plant processes for cooling tower makeup. Construction of new cooling facilities to replace once-through facilities and new water treatment plants designed to reduce the discharge of pollutants into the marine environment shall be permitted when consistent with other Coastal Plan policies. (Once-through systems in new or expanded refineries are permitted only according to the standards set by Marine Environment Policy 9.) [E-p38]

TANKER TERMINALS

FINDINGS

Petroleum Imports and Tanker Size Have Grown. As California has increased its importation of crude oil and refined products over the past 20 years, tanker size and numbers have increased to handle the expanded import volume. The search for improved efficiencies and economies in transporting large volumes of crude oil has led to the development of supertankers (tankers over 100,000 deadweight tons) and Very Large Crude Carriers ("VLCCs", i.e., tankers larger than 200,000 dwt). Supertankers now use some of the State's tanker facilities,

but the deep drafts of Very Large Crude Carriers cannot be accommodated in California tanker terminals. The need for more tankers and any new tanker facilities will be based on future import levels to meet the State's refinery needs and utility company imports. [E-f91]

Several Variables Affect Tanker Import Levels. Variables that will affect tanker import levels are: (1) general economic conditions in California and the West; (2) California's in-State petroleum production; (3) possible reduced petroleum demand through energy conservation and increased prices; (4) possible reduced petroleum demand through development of alternative energy sources; (5) energy export and import levels to and from other states (i.e., oil and gas to the Midwest, electricity from Four Corners, natural gas from Alaska, etc.); and (6) Federal energy policies affecting Outer Continental Shelf (OCS) production, import levels, interstate shipment of oil, and siting of tanker terminals. All of these factors will combine to determine the need for importation of petroleum by tankers. [E-f91]

California Is a Regional Petroleum Supplier. At present California plays a regional role in receiving and supplying oil and petroleum products to other states in the Petroleum Administration for Defense District Five (PAD V, consisting of California, Arizona, Nevada, Oregon, Washington, Alaska, and Hawaii). In recent years, California's role in supplying these states has declined, as the Pacific Northwest and Hawaii have developed their own terminal and refinery capacities. Some experts have forecast that by 1985 exports from California to other PAD V states will cease entirely, and that California's "regional role" will be, in effect to supply its own very large demand. It is more likely, however, that California will continue to account for some relatively small amounts of petroleum exported to other states in the region, and planning for tanker terminals should reflect this fact. [E-f92]

California's National Role in Supplying Energy Is Not Defined. In recent months, at least two major oil companies have begun to consider plans to ship Alaskan oil to California terminals for subsequent pipeline transshipment to the Midwest. Despite oil industry assertions that planning for tanker terminals in California should accept this State's national role in supplying energy, such a possible role has not yet been clearly defined by any Federal agency as a part of any comprehensive national program for energy conservation and development. [E-f92]

Alaskan Oil May Come In Tankers Up To 150,000 DWT. It appears that California's increased petroleum import needs may be met by Alaskan crude oil when the Alyeska pipeline begins operation in late 1977 or 1978. Because export of Alaskan crude oil to Japan is prohibited by the Alaskan pipeline bill unless mandated by presidential proclamation, the Alaskan North Slope crude is expected to be transported by ship to the Pacific Northwest and California. Most oil companies report that the vast majority of the 1.2 to 2.0 million barrels per day volume of Alaskan oil expected to come to California will be transported in tankers under 150,000 dwt. [E-f99]

Foreign Low-Sulfur Crude Oil Will Continue to Come in Tankers Under 150,000 DWT. Low-sulfur crude oil will probably continue to be imported from foreign sources, but with an associated minimal increase in consumer prices this oil can be transported to California in conventional draft tankers of about 150,000 dwt or less. Increases in desulfurization refining capacity will reduce the amount of low-sulfur crude oil imported. [E-f99]

Existing California Tanker Terminals Are Below 150,000 DWT Capacity. No existing California tanker terminal can accommodate conventional tankers larger than 138,000 dwt (Port of Long Beach), although, with only minor dredging and expansion of onshore pipelines and storage tank facilities, this limit could be increased to about 150,000 dwt for ships of conventional draft. With some modifications to existing facilities the Port of Long Beach could berth three tankers of up to 200,000 dwt of the wide beam configuration now being proposed; or tankers up to 138,000 dwt of conventional draft. The Port of Los Angeles facilities can accommodate loaded tankers of about 90,000 dwt. And El Segundo offshore buoy systems can serve tankers of about 130,000 dwt. San Francisco Bay facilities at Richmond allow berthing of light-loaded tankers of 130,000 dwt. Although under unusual conditions a fully loaded 104,000 dwt tanker was able to cross the sand bar outside the Golden Gate, the bar normally prohibits the entry of any fully-loaded tankers larger than 85,000 dwt. [E-f99]

Tanker Terminals Can Be Sited Away from Refineries And Market Areas. Tanker terminals have usually been sited in close proximity to refineries and power plants, which in turn have been located near product markets (metropolitan areas). Extensive pipeline systems are capable of reducing the need for this traditional clustering, however, allowing tanker terminals to be sited away from refineries, power plants, and product markets. For example, Standard Oil of California's proposed Estero Bay terminal would require about 280 miles of pipeline. [E-f93]

Tanker Facilities Pose Potential Environmental Impacts. Harbor or nearshore tanker facilities may require dredging and filling for both the berthing area and land storage tanks, with potential for significant adverse environmental effects on marine life and tidal action (as discussed in the Marine Environment chapter. [E-f94]

Tanker Terminals Encourage Related Development. Tanker terminals and related onshore facilities do not themselves require large amounts of land except for tank farms, but they can encourage related development that need not be situated near the coast. The presence of major refining capacity frequently leads in turn to the development of associated secondary industries (e.g., petrochemical, plastics) in the same immediate area. Tanker terminals that encourage refinery construction nearby onshore could, therefore, promote the use of valuable coastal land for purposes accomplished just as well at inland sites, could contribute indirectly to increases in air pollution in coastal areas, and could also induce growth of related commercial and residential areas. Tanker terminal siting strategies can be effectively coordinated with broad regional or State planning for growth. [E-f95]

Several Deepwater Terminals Have Been Proposed For California. Oil companies and utilities must by economic necessity look beyond the immediate future when investing millions of dollars for future tanker terminals. To reduce transportation costs, several oil companies propose to use VLCCs ranging from 200,000 to 400,000 dwt (water drafts of 60-90 feet) to ship crude oil to California from the Middle East and Indonesia. No existing California terminal facilities can accommodate tankers of these dimensions. However, unless foreign imports into California from the Middle East and Indonesia, or from places similarly distant, are very high, the frequency of use of a California deepwater terminal might be insufficient to justify the cost of terminal construction and the commitment of coastal resources to such a project. If such imports totaled 170,000 b/d, for example (as some experts have estimated), all brought in

supertankers of about 200,000 dwt, a supertanker terminal facility would be in use only about one-sixth of the time.

Oil Companies and Utilities Have Proposed New or Expanded Tanker Facilities.

To meet their projected needs for increased volumes of oil from outside California, oil companies and utilities have proposed new or expanded tanker facilities at Estero Bay (up to 400,000 dwt, Standard Oil of California), Moss Landing (up to 130,000 dwt, Pacific Gas & Electric), and Long Beach or Los Angeles Harbor (less than 200,000 dwt, Standard Oil of Ohio), with further proposals likely to follow. Standard Oil of Ohio has proposed to ship Alaskan crude oil to the Los Angeles area in 165,000 dwt tankers for subsequent transshipment to the Midwest through a yet-to-be-approved-or-constructed pipeline. ARCO is considering a similar plan, probably using tankers of up to 150,000 dwt. Presumably such transshipment proposals would be economically feasible only if there were a surplus of crude oil available in California. [E-f97]

No State Agency Coordinates Tanker Terminal Siting. No single State agency oversees and coordinates the siting of tanker terminals in order to maximize efficient siting and minimize environmental risks and impacts. [E-f91]

Multi-Company Sharing of Facilities Reduces the Need for More Facilities.

Most existing tanker terminals are owned and operated by single companies or port jurisdictions that lease specific berths to single companies. Multi-company sharing of tanker facilities would reduce the need for new or expanded tanker terminals. Terminal efficiency (i.e., maximum volume with minimum waiting time and high use of facilities) increases with the number of berths available to any ship. Thus, with multi-company use, more volume could be handled by existing facilities, reducing the need for new or expanded facilities for deep draft vessels. Such "common carrier" practices are being analyzed by the anti-trust division of the Justice Department. [E-f100]

Existing Tanker Terminals Are Under-Utilized. Existing tanker facilities are under-utilized, largely because many of them are operated by single companies which do not fill berth capacity. If terminal facilities were utilized to their maximum extent, it appears that California's petroleum needs could be accommodated in existing facilities for some time, given the following conditions: (1) California receives and refines the vast majority of Alaskan crude oil production; (2) California's demand for petroleum does not exceed projected levels and California does not become a major exporter of crude oil to states outside of the region; (3) tanker size does not exceed about 150,000 dwt of conventional draft, with some existing facilities expanding to accommodate such tankers where only minor dredging is required; and (4) minor expansion of onshore pipelines and storage facilities occurs.

A representative of the U.S. Army Corps of Engineers has stated: "We agree that existing tanker facilities can accommodate Alaskan import volumes not only until at least 1985, but possibly to the year 2000. However, this alternative, where feasible, may not be the most economical. The need for deepwater terminals is a relative need and not an absolute need. The consequences of deferring offshore deepwater terminals could mean the loss of economic advantages and greater environmental hazard due to increased traffic at inshore harbors." [E-f101]

Regional Amplification

South Coast: The upper limit of present terminal facilities, with minimum dredging, in the South Coast Region is loaded tankers of approximately 150,000 dwt of conventional draft, which is the maximum size to be used on the Alaskan routes to the Region. An additional six berths in Long Beach and four in Los Angeles Harbors are presently available which could be developed to handle these tankers. These berths could handle the oil requirements of all refineries in the Region.

The relatively small proportion of crude oil likely to come from the Middle East during this time period (1974-1985 or 1990) would not justify building facilities for VLCC tankers in the Region. [E-f101RA]

Siting Considerations for Offshore Tanker Terminals. California may eventually require expanded tanker terminal capacity to accommodate increased crude oil imports. The environmental siting considerations for new or expanded facilities offshore are as follows:

1. Offshore versus Nearshore Areas. New offshore areas with naturally deep water would entail only minimal dredging for pipelines, could locate the tankers away from areas of critical biological concern in nearshore areas, and could be sited away from busy vessel traffic lanes so as to minimize the risks of oil spills. Offshore facilities, however, would be subject to greater wind and wave action and spills that occur would be more difficult to contain. New or expanded tanker facilities in nearshore areas would most likely involve more environmentally damaging dredging and filling, and pose greater risks of oil spills that could affect vulnerable marine life. Harbors, however, are sheltered from wind and waves and can provide better spill containment capability.
2. Physical Constraints to Siting. Tanker terminals must be sited with careful attention to meteorological (wind, fog, storms), hydrographic (waves, tides, tsunami), and oceanographic (bathymetric and distance to shore) factors that will dictate the optimal sites available to serve onshore areas.
3. Offshore Offloading. VLCCs can be unloaded into smaller "shuttle" tankers while remaining in deepwater areas offshore. This practice has already been used off California, but involves increased congestion of smaller tankers near onshore facilities and appears to present greater risks of operational oil spills. When done under benign weather conditions, this practice can be done with little additional risk; however, the lack of experience with this practice precludes any complete risk analysis based on operational experience.
4. Monobuoys versus Conventional Buoy Systems. Tanker facilities used throughout the world include piers, floating barges, platforms, island, and offshore conventional buoy mooring systems and monobuoys (single point mooring systems). Offshore sites in California employ pier berths or conventional buoy systems (usually five to seven buoys) which have thus far proven satisfactory for tankers up to 130,000 dwt, although several proposals now advocate using monobuoys. Monobuoys allow a tanker to freely swing around the berthing facility and appear to involve fewer

environmental hazards than conventional buoy systems, which hold tankers rigidly exposed to wind, wave and current action. Maintenance of hose lines is particularly important in these offshore systems that are exposed to wind and wave action. [E-f102]

Supertankers Offer Several Economic Advantages. Supertankers reduce the transportation costs of crude oil roughly in proportion to the size of the ship and distance traveled. While the transportation costs to shippers may be substantially reduced through use of larger vessels (e.g., tankers of between 70,000-dwt, which carry about 450,000 barrels of crude oil, and 200,000-dwt, which carry about 1.5 million barrels of crude oil), particularly over very great distances such as between the Middle East and California, the price difference accruing to consumers is relatively much less significant (e.g., less than one cent per gallon of gasoline from Alaskan oil, and about two and a half cents per gallon of gasoline from Middle Eastern crude, with no guarantee that industry's cost savings will be passed on to consumers). Some of the savings from use of larger vessels results from reduced tanker fuel consumption per unit of oil transported. [E-f96]

Oil Spill Severity Is Related to Tanker Size. A major study for the Army Corps of Engineers concludes that "although larger tankers are, per unit of oil transported, lesser sources of pollution through casualties, it is also undoubtedly true that the potential for an incident of higher severity exists." Regarding terminal operations involving supertankers, the same report concludes that "although the frequency of terminal spills may decrease with the use of larger vessels, the severity will likely increase in proportion and the total net discharge will not be significantly changed." Definitive comparisons of tanker size to operational safety may be premature, however, until more data becomes available. Other factors directly related to frequency and size of oil spill are vessel age, design, single or double hull construction, and degree of compartmentalization; prevailing weather conditions, and regulations governing operations in severe weather; and degree of a crew's operational experience in particular waters on harbors, among other human factors. (See findings in Petroleum Development and Oil and Toxic Spills sections for conclusions regarding oil spill containment, cleanup, spill liability, and damage potential.) [E-f98]

Tanker Design Criteria Need Upgrading. Tanker design, equipment, and operational procedures have steadily improved over the past 20 years, allowing larger volumes of petroleum to be shipped, and reducing the risks of oil spills. Such improvement is due in substantial part to the work of classification societies, international conventions, and the U.S. Coast Guard, which set minimum standards for structural strength, machinery design, maximum load, and equipment requirements, and which promulgate regulations that address pollution control, vessel safety, and vessel design and operation. Such regulation notwithstanding, oil spills have consistently occurred that might have been prevented or mitigated had the vessels had the safest tanker design features now available.

Several Improved Design Features Are Now Available. Such features are still not fully implemented in all new tankers, primarily because industry questions whether they are "cost effective." They include: design features that aid "load-on-top" procedures, which allow oil and water to be effectively separated and reduce the flushing of oil into the ocean; segregated ballast configurations that provide separate oil tanks and water ballast tanks; twin propellers and twin rudders for added maneuverability and operational backup; and auxiliary

power systems (e.g., boiler or diesels) to propel the vessel if the primary system fails. Development by the U.S. Coast Guard of minimum performance standards for maneuverability and stopping capability would further encourage safe tanker design. Coast Guard studies indicate that double bottoms reduce the overall risk of spills. Standard Oil of California is building tankers with double bottoms for use in the coastal trade. [E-f103]

POLICIES

153. Continue Tanker Terminal Planning Based on PAD V Needs. Planning for tanker terminal facilities in California should be sensitive to national energy needs. However, until the nation's energy needs and supply and distribution policies have been clearly defined, and California's role in a comprehensive national energy conservation and development program is precisely identified, planning should proceed, as before, on the basis of the petroleum needs of the Fifth Petroleum Administration for Defense District (PAD V, consisting of California, Arizona, Nevada, Oregon, Washington, Alaska, and Hawaii). Where necessary to meet needs elsewhere in the United States, oil companies should exchange volumes of crude oil instead of shipping it through California (e.g., exchange Middle Eastern oil formerly destined to California for Alaskan oil to be marketed in the Midwest). Even if national policy determines that petroleum must be moved through California to the Midwest or East, tanker terminals and associated development shall be approved only if they can be designed, built, and operated in accordance with all applicable Coastal Plan policies. [E-p28]

154. Maximize Use of Existing Tanker Facilities. Existing tanker facilities should be utilized at maximum feasible berth occupancy and multi-company use of existing facilities shall be encouraged, except where increased tanker operations and associated onshore development would be incompatible with land use and environmental goals for the area. [E-p29a]

155. Require Showing of Need, Set Environmental Safeguards. New tanker terminals (or expansions) should be permitted only when it can be demonstrated that: (1) there is a need for new capacity that cannot be met elsewhere with less risk of adverse environmental impacts through more effective use of existing terminal sites and facilities; (2) tankers smaller than about 150,000 dwt of conventional draft could not feasibly be used; (3) the proposed project will minimize significantly the total volume of oil spilled in normal and accidental operations; (4) the location, design, and construction of the new capacity minimize the risks of other adverse effects to the environment; and (5) the onshore expansion of pipelines and of storage and pumping facilities associated with the new capacity is not incompatible with local land use and environmental goals, and is carefully designed to minimize adverse environmental impacts. [E-p30]

Regional Amplification

South Coast: In order to reduce the need for new or expanded tanker terminals in the South Coast Region, minor dredging and modifications to berthing capacity, and construction of additional storage capacity, should be carried out as they are required to accommodate tankers of up to about 150,000 dwt of conventional draft. In addition oil companies should pursue the practice of jointly utilizing terminals that can handle this size of tanker. Onshore expansion of pipelines and storage facilities should be permitted where the result is to increase the efficiency and capacity of existing tanker terminals.

New or greatly expanded terminals for ships larger than about 150,000 dwt of conventional draft should not be allowed until southern California petroleum imports from Indonesia and the Middle East are expected to rise to more than one million b/d within the period of time necessary to construct such terminals. [E-p30RA]

156. Siting and Design Criteria for Major New Tanker Terminals. Major new California tanker terminals should: (1) be sited in deepwater areas (greater than 80 feet) sufficiently far offshore and so situated as to avoid risks to areas of critical biological concern; (2) be sited well out of vessel traffic lanes; (3) be owned and operated as multi-company use facilities; (4) have ready access to the finest state-of-the-art containment and recovery equip-

ment for oil spills; (5) where appropriate, and unless an alternative type of system can be shown preferable for a specific site, use monobuoy offloading systems; and (6) where operationally required, have onshore deballasting facilities to receive any fouled ballast water from tankers. [E-p31]

157. Encourage Use of Most Modern Tanker Technology and Operating

Procedure. The California Legislature should petition Congress and the U.S. Coast Guard to: (1) strictly enforce load-on-top design and operation on all petroleum tankers entering U.S. waters [E-p32a]; (2) require that all tankers carrying crude oil and refined product to U.S. ports have segregated ballast tanks; double bottoms; twin propellers and rudders unless it can be demonstrated that a substitutable design feature provides better maneuverability and operational back-up; auxiliary power equipment (e.g., double boilers) for propelling the vessel in case of engine breakdown; and state-of-the-art navigational aids maintained in functional condition; and (3) ultimately, that all tankers meet performance standards requiring optimum maneuverability and operational back-up. The Coast Guard should strictly enforce such requirements by increasing the number of vessels it actually visits for inspection and should maintain radar control over vessels in U.S. coastal waters. [E-p32b]

LNG FACILITIES

FINDINGS

Importation of LNG Requires Ship Terminals and Onshore Facilities. Natural gas is considered to be the cleanest burning and most efficient fossil-fuel for heating purposes. The most significant potential sources of natural gas for California are primarily in Alaska and overseas. To be transported economically by ship, natural gas must first be liquefied by cooling it to -259°F. to reduce its volume by a factor of 600. After shipment to areas near existing markets or pipelines, liquefied natural gas (LNG) is stored in large tanks and vaporized in a plant as it is needed. With present technology, terminal and associated facilities for LNG must unavoidably be situated on the coast. [E-f113]

Gas Companies Have Proposed Three Coastal Sites. Western LNG Terminal Company (subsidiary of Pacific Lighting Company) is already seeking Federal Power Commission (FPC) approval for an LNG terminal and facility at Oxnard (Ormond Beach) to handle LNG from Indonesia, a second terminal and facility in Los Angeles Harbor to handle LNG from southern Alaska, and a third terminal and facility at Point Conception for LNG produced as gas on the Alaskan North Slope and piped to Southern Alaska for liquefaction. Final FPC action on these three proposals is not expected prior to late 1975—early 1976. PG&E has stated that the feasibility of locating such facilities in the San Francisco Bay Area is also currently being studied. [E-f114]

FPC Is Considering Canadian Pipeline Alternative. The Point Conception proposal is an alternative to a pipeline proposed through Canada, which would serve California along with the western and midwestern U.S. and eastern Canada. A decision by the FPC is pending on the choice of the alternatives, but reportedly will not be forthcoming before July, 1975, at the very earliest. [E-f114]

LNG Is a Hazardous Substance. LNG is difficult to handle because (1) the extremely low temperature at which natural gas is liquefied causes unique stresses on normal containment materials, and requires special alloys to avoid such stresses; and (2) in the event of an escape of LNG, there is very rapid formation of a vapor plume, which the low temperature causes to hang close to the ground until its temperature increases to make the gas lighter than the air. Unconfined, the vapor mixed with air is not explosive, but in a ratio of 5-15 per cent vapor to air it is highly flammable. Within enclosed spaces, if thus mixed with air in the presence of an ignition source, it can explode. The primary danger present in a large-scale LNG spill is a very intense fire at the spill site; a more remote hazard is that the vapor plume could drift into enclosed spaces adjacent to a spill site and explode or catch fire. [E-f115]

LNG Spill on Water Presents Fire or Explosion Hazard. The greatest danger of serious fire or explosion would occur following a major spill of LNG on water; the consequences would be most serious in an active harbor area. The heat of the seawater and large spill surface area result in very rapid vaporization. The FPC staff has stated that if in a "worst case accident" an entire shipload of LNG were released instantaneously without being ignited, it would evaporate in about 37 minutes, forming a very large, cold, dense vapor cloud.

Under conditions of very light winds (5-10 knots) and stable air, the flammable cloud could extend as far downwind as three miles. Experts believe it very unlikely that a vapor cloud of even this size could form and drift very far without encountering an ignition source and causing a fire that would burn back to the site of the spill. The most likely such ignition source would be the collision itself. The chances of an accident causing any spill can be reduced by special safety features for LNG carriers, and by the Coast Guard's use of strict traffic control procedures during passage of loaded carriers into a harbor. [E-f116]

Safety Measures Needed to Reduce Risk of LNG Spill on Water. Because of the potentially disastrous effects of a large-scale LNG spill on water, particularly near a developed area, the Coast Guard prescribes and implements measures to ensure safe passage of LNG carriers into berthing facilities. Safety measures are determined according to conditions at each particular site. Measures presently

required by the Coast Guard for bringing LNG carriers into New York and Boston Harbors, for example, include: near-harbor escort of the LNG carrier by a Coast Guard vessel; controlling or halting other marine traffic in the area during loaded LNG carrier operation depending on the circumstances; use of tug boats; special arrival notifications; and restrictions on proceeding under specified visibility conditions. [E-f117]

LNG Spill on Land Also Dangerous. The most significant potential for serious fire at LNG facilities on land would occur following complete or partial failure of a storage tank. This potential can be minimized by use of the highest quality structural and insulating materials, proven tank operating and rigid maintenance procedures, use of proven technology for tank venting, and construction of a containment around each tank sufficient in capacity to hold the entire tank volume in the event of complete failure. When a containment is filled with spilled LNG, a relatively small amount of LNG surface is exposed, and rapidly frozen ground acts as an insulator against a continued flow of ground heat; therefore vaporization occurs much more slowly than in the case of a spill on water. [E-f118]

High Containment Dikes Will Confine Flammable Plume. Under conditions of light wind and stable air, flammable vapor mixtures resulting from the failure of an LNG storage tank may initially extend downwind as far as a mile. Proponents, however, believe that in most instances, after the initial period of "flash" vaporization, the flammable zone will be as little as 200-400 feet downwind; and that if the containment is a high dike around each tank, as planned for facilities near populated areas, the flammable plume will be confined within the facility's property limits even under worst case conditions. [E-f118]

Danger Greatest at the Site. If the vapor is ignited, the flame will burn slowly back to the LNG pool, where the resulting fire could create intense radiant heat capable of igniting combustible materials within 500 feet, and endangering exposed personnel within 2,000 feet (with high dikes, these distances can be substantially decreased). Automatic and individually activated remote control devices around the plant site that release appropriate materials can help control LNG vapors and extinguish LNG fires. [E-f118]

Accident Probability Is Low But Not Eliminated. Statistically the probability of a very large accident involving LNG is very low. Except for its very low (cryogenic) temperatures and propensity to form a flammable vapor cloud that can drift downwind, the problems and risks connected with LNG handling and storage are thought to be similar to those associated with handling and storage of such accepted hydrocarbons as gasoline and liquid propane. Improved LNG technology can now address the normal safety problems; however, the potential for serious accident caused by human errors, or by such events as earthquake, tsunami, disaster at a neighboring facility, a major act of war, sabotage, or airplane crash can be partially designed against, but not entirely eliminated. [E-f119]

LNG Spill Harms Plants and Animals. Plants and animals subjected to a dense cold vapor cloud of LNG would probably be killed. Birds might be able to evade the vapor cloud. The effects on marine populations of an LNG spill on water are not well known. The thermal shock caused by chilling of the surface water would presumably cause some measure of mortality, but most likely would not have significant long term effects on marine populations. [E-f120]

Methods of LNG Regasification Involve Problems. Regasification at a receiving facility is typically carried out in one of two ways: using gas-fired vaporizers; or using seawater at ambient temperature as a heat source for vaporization.

- (1) Gas-Fired Vaporizers Pose Air Pollution Problem. The disadvantages of gas-fired vaporizers for baseload use are that one to two per cent of the plant's output would be used to fire the vaporizers and that there would be continuous air pollution emissions.
- (2) Use of Seawater Adversely Affects Marine Life. Use of seawater in LNG vaporization presents problems of entrainment of sealife as water is drawn into the system and discharge of cooled seawater at below ambient temperatures, after its use in the system. (See Marine findings regarding the effects of entrainment and thermal discharges.)

Chemical biocides periodically added to the seawater for defouling of the water pipes also have the potential to adversely affect marine life if they are not neutralized. These effects would be subject to regulation by the Regional Water Quality Control Boards on a case-by-case basis to prevent adverse effects on beneficial uses of receiving waters. [E-f121]

Physical Criteria for LNG Facility Siting. Selection of a site best-suited physically to accommodate LNG port and plant facilities involves at least the following considerations:

- (1) Control of Nearby Development. Facilities need to be situated so as to minimize the exposure of population and property to the possible effects of a major accident. Land use controls, including purchase of surrounding lands, need to be sufficient to prevent new development within the hazard zone around the LNG plant in the future.
- (2) Avoidance of Seismic Hazard Areas. Facilities need to be situated away from areas of significant seismic hazard, and wherever sited, should be designed to withstand fully the maximum credible seismic risk at the site. [E-f122]
- (3) Deep Draft Port Facilities. Port facilities need navigable waters deep enough to accommodate LNG carriers (40 feet or greater draft) and sufficiently sheltered for year-round operation. Significant dredging might be required.
- (4) Sufficient Acreage For Land Facilities. Land facilities need sufficient acreage for: storage tanks up to 125-150 feet high and 240-270 feet in diameter; space between tanks to permit dikes, runoff, and catch-basin facilities; additional space to reduce the potential for radiant heat from a fire at one tank igniting another tank; and space for vaporization facilities capable of regasifying peak loads at rates of as much as five billion cubic feet or more per day. Total acreage for land facilities may be as much as 100-200 acres. [E-f122]
- (5) Location Near Market Areas. Land and port facilities need not be all in one contiguous parcel and the land facilities need not be immediately adjacent to the port; however, it is extremely expensive and increases exposure to others to pipe gas in its liquefied form outside of the

facility. There are also economic advantages in siting LNG facilities near major market areas, although piping the regasified natural gas relatively long distances is clearly feasible.

- (6) Gas Transmission Systems. Facilities must have adequate gas transmission systems. [E-f122]

Potential Siting Alternatives: Rural, Industrial, Harbor, and Residential. Very generally stated, a site selected in a rural area will pose the greatest impact upon the natural environment, but in the event of a major accident would expose a minimum number of people to danger. Siting in a rural area could open the area to further port and industrial development, which in turn could encourage the growth of new residential communities. Industrial locations in developed harbors would tend to have a minimum impact on the natural environment, but would pose greater risk to human safety in the event of an accident. [E-f123]

Harbors—particularly those with large industrial areas—will have heavier ship traffic control, calmer waters, and less exposed berths. Location near a residential area will have a moderate impact on the natural environment, could present social and economic impacts on the community, and would expose the population to the risks, however slight, of a major accident. [E-f123]

Several Agencies Will Regulate Environmental and Safety Features of LNG Facilities. The Federal Power Commission (FPC) must approve projects for LNG imports from other states or foreign nations. It is the lead agency for such projects, and is responsible for preparation of environmental impact statements under NEPA. It is not yet clear whether FPC jurisdiction will preempt the right of State and local agencies to regulate the site location aspects of LNG facilities. Safety aspects will also be regulated by the Coast Guard (shipping-related), the Office of Pipeline Safety (land facilities), the Occupational Safety and Health Agency and the State Division of Industrial Safety (employee safety), the Federal Aviation Agency (aircraft safety), and the applicable local fire, harbor, and building and safety departments. Other environmental aspects will also be the concern of the designated lead agency under CEQA, the Army Corps of Engineers (marine facilities), the RWQCB and the local APCD. The NEPA and CEQA environmental impact review, and the RWQCB review, will also include review by other interested agencies as applicable. [E-f124]

POLICIES

158. Regulate Siting and Design of LNG Facilities. It may be desirable to locate some liquefied natural gas (LNG) facilities in the coastal zone. [E-p39]

Any proposed LNG facility shall meet the following criteria:

- a. Limit Number of Terminals Until Safety is Assured. Only one LNG marine terminal may be permitted in the California coastal zone until (1) it can be conclusively demonstrated on the basis of experimental data that

engineering and operational practices can eliminate any undue risk, or
(2) it can be demonstrated that guaranteed supplies of LNG are substantial enough that an interruption of service from one LNG facility will cause substantial public harm. [E-p41]

- b. Site LNG Facilities to Minimize Risk. Until such a demonstration of safety can be made, LNG facilities shall be sited in areas with existing but minimal port or industrial facilities to limit exposure of life and property while avoiding pristine natural areas. Once safety can be assured, facilities should be sited in industrialized ports. [E-p40]
- c. Restrict Dredging and Filling. Where permitted, new LNG port facilities shall not involve dredging or filling of wetland areas unless it can be demonstrated that there is no less environmentally damaging alternative. Any such dredging and filling shall conform to the policies of the Marine Environment section of the Coastal Plan. [E-p40]
- d. Minimize Adverse Environmental Effects. Where permitted, LNG facilities shall be located and designed to minimize adverse environmental effects. The applicant for an LNG marine terminal and onshore facilities shall submit a comprehensive evaluation of alternative coastal sites, including the environmental, economic, and operational reasons for rejecting them in favor of the proposed site, sufficiently in advance of a desired decision that an adequate and independent analysis can be made, and such material should be included in any environmental impact report required. LNG facilities must also be consistent with other Coastal Plan policies, especially those in the Marine chapter regarding heated and cooled discharges. [E-p42]

159. Safety Measures Required During Marine Operations. All possible measures shall be taken to maximize the safe passage of LNG carriers into berthing facilities. Such measures shall include, where appropriate, application of

measures presently used for LNG carriers in New York and Boston Harbors: control or halting of other marine traffic by the U.S. Coast Guard during loaded LNG carrier operation or during inclement weather conditions, near-harbor escort of LNG carriers by a Coast Guard vessel, and use of tug boats in harbor areas. Demonstration of an adequate traffic control system and safely designed berthing facilities sufficiently removed from other traffic flows and of sufficient size to permit maneuvering shall be required. [E-p44]

160. Safety Measures Required at Onshore Facilities. The following measures should be part of any LNG project on the coast:

- a. Best Design and Technology. The highest state-of-the-art engineering design and technology, and proven alloys, should be used in construction; each storage tank should have the double-wall construction now standard in the industry;
- b. Special Storage Tank Design and Operation. Storage tanks should be equipped and operated to avoid sudden evolution of a large quantity of vapor that cannot be adequately vented by the pressure relief valve system.
- c. Provide Containment Around Tanks. Each storage tank should be surrounded by sufficient containment for the entire contents of the tank with a minimum surface area pool. At sites near populated or developed areas the containment should include a dike designed to reduce vapor plume travel as much as possible. The dike should also be designed to give protection to the tank against severe weather or radiant heat from adjacent tanks in the event of a major fire, and to give protection against airplane crash or sabotage attempt. Storage tanks and dikes should be designed to withstand the maximum credible seismic event for the area.

- d. Set Tanks Apart. Storage tanks should be sufficiently far apart to minimize the possibility of an accident at one tank affecting another tank.
- e. Best Fire Protection and Fire-Fighting Technology. Storage tanks should be equipped with the best available fire protection and fire-fighting technology, and the developer should be required to demonstrate the adequacy of fire fighting plans, equipment, and personnel to control major fire at all times.
- f. Provide Containment Around Pipelines. Exposed LNG pipelines should be surrounded by dikes or other containment structures capable of containing the maximum credible spill that might occur in a major rupture before shutdown of the entire pipeline system could be effected. The developer should be required to demonstrate adequate and continuous monitoring, alarm, process shutdown, and fire response plans for a pipeline and storage tank rupture.
- g. Have Standby Power. An independent standby power system should be provided to maintain essential operational and emergency systems during a power failure. [E-p45]

161. Establish Liability for Accident Damage. The State Legislature should consider establishing strict liability for damage occurring as a result of LNG shipping or plant operations, except acts of war, and consider creation of a safety indemnity fund, financed by levy of a fee on LNG imports, to ensure that all damages and costs resulting from a LNG accident are quickly compensated. The Legislature, the Public Utilities Commission, and the Energy Commission should make certain that sufficient research and development pertaining to LNG safety issues is carried forth to fully justify development of LNG importation projects in California. [E-p46]

Development

Basic Policies for Coastal Zone Development

FINDINGS

Planning for Development To Be Consistent with Coastal Zone Act. The California Coastal Zone Conservation Act declares that the coastal zone is a distinct and valuable natural resource belonging to all the people, and requires that planning for development be consistent with all of the following objectives: (1) the maintenance, restoration, and enhancement of the overall quality of the coastal zone environment, including, but not limited to, its amenities and aesthetic values; (2) the continued existence of optimum populations of all species of living organisms; (3) the orderly, balanced utilization and preservation, consistent with sound conservation principles, of all living and non-living coastal zone resources; and (4) the avoidance of irreversible and irretrievable commitments of coastal zone resources. [I-f1]

POLICY

162. Basic Goals and Policies Governing Coastal Zone Development. The basic goals and policies governing development in the coastal zone should be the protection and enhancement of natural resources and man-made resources, favoring of coastal-dependent uses over other development on the coast, maximizing public access to the coast, encouraging orderly, balanced development, and restoring lost or degraded coastal resources, as amplified below and elsewhere in the Coastal Plan:

- a. Protect and Enhance Natural Resources. Because significant natural resources of the coastal zone have been lost due to inappropriate development, because the supply of such resources is limited, and because the natural resources both support human life and make possible enjoyment and use of the coast, development in the coastal zone should be permitted in a manner that protects coastal resources.
- b. Protect and Enhance Marmade Resources. Because some human communities and neighborhoods have unique cultural, historic, and aesthetic qualities

that contribute to the enjoyment of the coast, any changes or expansion of these resources should protect and enhance the special qualities of such manmade resources. (See Manmade Resources chapter.)

- c. Coastal-Dependent Uses Should Have Priority on the Coast. Because some uses of land and water, by their very nature, require a coastal site, coastal-dependent development should have priority over other development near the shoreline.
- d. Maximize Access to the Coast for All People. Because coastal resources should be protected, enhanced, and restored for the enjoyment of present and future generations, access to the coast for persons of all income levels should be maximized consistent with protection of resources. Commercial developments that provide recreational access for the general public should have priority over other private development. (See the Access and Recreation chapters). Development at or near the coast should not be allowed to block pedestrian and transportation access to the coast nor to unnecessarily interfere with public and private views of the coast. (See the Transportation and Appearance and Design chapters).
- e. Orderly, Balanced Utilization of Coastal Zone Resources. Because the division of land and piecemeal development that is not coordinated with the provision of public services is more likely to have an adverse effect on the protection of, and access to, coastal resources, development should not exceed coastal transportation and recreational carrying capacities, should be concentrated in already-developed areas or in other areas where no potential exists for significant adverse impacts on coastal resources, and should be consistent with and phased with existing and approved public services and facilities. All public services and divisions of land should be regulated in accordance with these criteria.
- f. Restore Lost or Degraded Coastal Resources. Because the supply of natural and manmade resources in the coastal zone is finite, and because the

supply is in many areas short of potential demand, such resources should be restored and enhanced whenever possible. [I-p1] (See Restoration of Coastal Resources chapter.)

Development Affecting Natural Resources

FINDINGS

Natural Resources Support Human Life and Uses of the Coast. Valuable natural resource areas of the coastal zone have been identified in preceding Plan chapters. These finite resources, which often extend inland further than 1,000 yards, support human life and make possible enjoyment and use of the coast. Such resources include wetlands and estuaries, tidepools, coastal streams vital to anadromous fish runs and continued sand supply to the coast, natural areas that should be preserved for future scientific study, education, and public enjoyment, habitats of rare and endangered species of animals and plants, productive and potentially productive agricultural (including grazing) and forestry lands, sand and gravel deposits, clean air, sandy beaches and dunes, recreational lands and waters, and highly scenic areas and coastal landforms as identified in the Appearance and Design chapter. [I-f2]

POLICY

163. Develop in Accordance with Protection of Natural Resources. Development in or near coastal zone natural resource areas shall be permitted only if it does not adversely affect the resources. [from I-pla]

- a. Protect Resource Production Areas. Coastal open spaces in agricultural, grazing, and forestry uses shall be protected for productive use and open space, and development or conversion permitted only as provided in Coastal Land sections on Agriculture and Forestry. [A-p23b]
- b. Development Should Complement Natural and Scenic Resource Areas. In natural and scenic resource areas other than those designated for preservation as productive or potentially productive farming and timber-harvesting areas and where some development may be allowed consistent with the resource protection and access policies of the Coastal Plan, first

priority should be given to activities that complement the resource values of the site, such as farm service facilities, horse stables and riding facilities, dude ranches and summer camps, outdoor recreation, fishing and hunting preserves, and small-scale tourist facilities to the extent that the need for them outside urbanized areas and rural communities can be demonstrated. If no other use is feasible, individual homes may be permitted, provided that minimum acreage and siting requirements are first established in accordance with the resource preservation and scenic view policies of the Coastal Plan, with particular regard to the cumulative impact of potential development in the area for which the requirements are to be adopted. [I-p3]

- c. Control Development That Increases Access to Sensitive Areas. Development providing access to sensitive areas (such as tide pools, coastal bluffs, educational reserves, historical and archaeological sites) and man-made resources (such as special coastal communities and neighborhoods) should be controlled in accordance with the appropriate Coastal Plan policies. [I-p9]

Orderly, Balanced Development

CONCENTRATING DEVELOPMENT IN URBAN AREAS

FINDINGS

Priorities Are Needed Among Competing Coastal Zone Uses. The coast is an extremely desirable place to live, work, and play. In the past 30 years, California's population has tripled to more than 20 million; 84 per cent of this population lives within 30 miles of the coast, and 64 per cent within the 15 coastal counties. In San Diego County, nearly 56 per cent of the population lives within 5 miles of the coast. Pressures for all types of development on or near the coast are high and can be expected to increase due to increased leisure time, mobility, changing life styles, and in-migration from some inland communities. The finite resources of the coastal zone cannot, however, accommodate all the pressures for development and change and still meet the needs of present and future generations for recreation, production of agricultural crops, and the enjoyment of unique coastal experiences. Therefore, priorities must be established among

competing uses of the coast, to assure a more orderly, balanced use and preservation of coastal zone resources. [I-f5]

Concentrating Development Enhances Use of the Coastal Zone. If development is prevented from sprawling over large land areas by being channeled to already urbanized areas (where public services exist), and by increasing the intensity of development in some areas consistent with the objectives of the Coastal Plan, the following advantages over sprawling development will often result: (1) natural, agricultural and other coastal resources will be preserved for human enjoyment as well as economic benefit; (2) a desirable contrast and diversity between city and country will be maintained; (3) air pollution and energy needs will be diminished because of shortened trips and the increased feasibility of public transportation; (4) duplication and costs of public services will be reduced by utilizing services already in place; (5) opportunities for increased physical and visual access to the coast for all people will be increased; (6) options for the future will be preserved by setting aside larger areas of land for potential future uses; (7) irreversible and irretrievable commitments of land inconsistent with the Coastal Plan will be avoided; and (8) existing downtown areas that have declined as a result of suburban sprawl will be revitalized. [I-f17]

Growth Can Be Accommodated Away from the Immediate Coastline. There are many alternatives to intensive urbanization of the shoreline. Many existing urban areas inland from the immediate coastline could accommodate such growth without degrading coastal resources. [I-f20]

Properly Located High Intensity Development Can Absorb Some Demand for Coastal Land. High-rise office buildings, large apartment and condominium buildings, shopping complexes, amusement parks and tourist attractions, and similar high-intensity developments in appropriate areas of cities can, if properly designed and located, absorb a substantial portion of the demand for those purposes that is now directed at older residential neighborhoods, open space areas, and other resource areas in the coastal zone. In addition, such high intensity development near the coast, especially in existing downtown areas, could at the same time enhance the viability of mass transit and reduce the consumption of energy used for heating and cooling because of the milder climate of coastal areas. High intensity development could also take up some of the presently underused capacity of many sewer and water systems without the need for costly new expenditures for public services and, by being located in existing urban areas, avoid the extension of growth-inducing services to open space or resource areas. [I-f18]

POLICIES

164. Concentrate Development in Already Urbanized Areas. New coastal development should be channeled into existing urbanized areas able to accommodate additional development, areas suitable and planned for redevelopment, or defined urban growth areas that can accomplish the same goals, detailed in the findings above. (The delineation of existing urbanized areas shall be es-

tablished either in the Coastal Plan or in subregional plans prepared by the Commission or the coastal agency, as described in the Subregional Planning chapter.) To this end: [I-pl7]

- a. Use Urban Land Effectively Before Allowing Expansion Along Coast. New development shall not be permitted to sprawl, project by project, into open areas. [A-p7] Expansions of existing urbanized areas (other than expansion on the inland side of the community) should not be allowed until the land resources within the existing urbanized areas are effectively used. [I-p17 and from A-p27a]
- b. Locate Visitor Facilities Near Existing Developments. Visitor-serving facilities should be located in or adjacent to some existing urban and village areas consistent with the community scale objectives of Policy 45, in existing isolated developments (such as Sea Ranch and Timber Cove), and at selected points of attraction for visitors (such as at the entrance to Point Reyes National Seashore), consistent with the Coastal Plan. [I-p9]
- c. Restrict Strip Development. Strip development that contributes to traffic congestion and impedes coastal access along major routes to the shoreline shall not be permitted; existing strip development should be eliminated where possible. [I-p9]
- d. Channel High-Intensity Development to Appropriate Areas. High-intensity development should be channeled towards existing downtown areas and other areas within and outside of the coastal zone where (1) development would not adversely affect coastal resources or coastal access; (2) mass transit capable of serving the development already exists or is planned and funded, and (3) development pressure on resource areas is relieved through enforceable development restrictions. [I-pl8]
- e. Plan Development to Reduce Auto Dependence. New development shall be planned to: (1) facilitate provision or extension of transit service, (2) provide

commercial facilities within or adjoining residential development to minimize the need for outside travel, and (3) provide non-automobile circulation within the development (e.g. shuttles, bikepaths, and walkways).

[T-p6]

Regional Amplification

San Deigo: Wherever feasible, the type and design of new commercial and industrial development shall be integrated with existing neighborhood patterns, and functional, design, and social relationships of existing and new uses maintained or enhanced. [A-p15RA]

165. Criteria for Divisions of Land. The division of land shall be permitted only if it is in accordance with an adopted subregional plan (see Policy 183) or, in the absence of a subregional plan, if all of the following conditions are met: (1) more than 80 per cent of the usable lots in a non-urbanized area have been developed to existing zoned capacity; (2) the parcels resulting from the division would be no smaller than the average size of surrounding parcels; (3) no significant growth-inducing impact or precedent for development in a natural resource or scenic resource area would be established by the division; (4) the division would not restrict future options for productive lands or lands of significance because of their scenic, wildlife, or recreational values; (5) all public services are readily available; and (6) the division conforms to other Coastal Plan policies (see especially Policy 33 regarding agricultural lands and Policy 37 regarding forestry lands). Where an increase in the number of parcels available for residential use is permitted, priority should be given to lands in or near already urbanized areas or other concentrations of development. This policy shall not be interpreted to require development of parcels that would adversely affect coastal natural and scenic resources. [I-p19]

166. Restrict Significant Developments in Areas Removed from Employment and Commercial Centers. The coastal agency shall permit significant new residential,

commercial, institutional, or industrial developments or other traffic-generating uses in locations removed from employment and commercial service areas only if (1) the project will be adequately served by alternative transportation modes that are less polluting or that reduce total vehicle mileage and energy consumption (such as buses) or (2) it can be demonstrated that the project will not harm coastal resources, will not contribute directly or cumulatively to significant degradation of air quality, and will not result in unnecessary fuel consumption. Determinations of air quality impact and fuel consumption shall include consideration of distances to employment and service centers and alternative locations for such developments. [E-p3a and L-p18b]

Regional Amplification

South Coast: Residential development in locations remote from employment and commercial centers shall not be permitted in this Region unless adequate public transportation or alternative transport modes to the automobile are available which reduce total vehicle mileage and air resource degradation. [E-p3RA]

COASTAL-DEPENDENT DEVELOPMENT AND USES

FINDINGS

Coastal-Dependent Uses Require Immediate Coastal Site. Some developments are "coastal-dependent" in that they must have an immediate coastal site to be able to function at all. These include fishing, aquaculture, and port facilities, extraction of coastal minerals (e.g., sand and offshore petroleum), tanker terminals, boat works, and shipyards, and marinas. [I-f7]

POLICY

167. Priority of Coastal-Dependent Development. Coastal-dependent developments, which by their very nature require a coastal site, shall have priority over other development on or near the shoreline. [I-p1c and I-p7] Where coastal-dependent industrial, commercial, and recreational developments (such as ports, yacht basins, certain mineral extraction activities) would have a substantial adverse effect on coastal resources, they shall be permitted only if: (1) alternative locations are either infeasible or more environmentally damaging; (2)

a careful balancing of environmental effects against State and national economic needs is made, with irreversible environmental damage weighing heavily in the comparison; [I-p8a] and (3) the environmental damage is mitigated to the maximum extent technically feasible in the design and execution of the project. [I-p8b] (See also relevant policies in the Coastal Land, Recreation, Transportation, and Energy chapters, and Policy 180 requiring restoration measures for developments that degrade coastal resources.)

INDUSTRIAL DEVELOPMENT

FINDINGS

Industrial Developments May Have Special Siting Requirements. Though industry is vital to the economy, industrial developments can also have major impacts on the coast, consuming valuable lands, intruding on the visual qualities of the coast, interfering with access, and affecting air and water quality. Locations for industry must take into account these impacts on the coastal environment and must also consider employment-generating potential and safety concerns of certain major industries. [new]

POLICY

168. Location of Industrial Development. Industrial development should be concentrated in already urbanized areas unless public safety requires other locations, as provided in the Energy chapter. Industrial facilities shall not be placed in or near important coastal resources such as estuaries, fragile or unique habitat areas, highly scenic areas, or man-made resources except for coastal-dependent industry where there is no possible alternative as provided in Policy 167. All potentially hazardous industrial activities or other industrial development that Coastal Plan policies have determined cannot be located in already urbanized areas (e.g., possibly LNG plants or power-generating facilities) shall be concentrated in isolated non-developed areas. All potential industrial sites in such isolated areas shall be used to the maximum extent feasible (subject to safety requirements) prior to the commitment of any new undeveloped areas. [I-pl7]

PROVISION OF PUBLIC SERVICES

FINDINGS

Public Services Availability Influences Development. The type, size, timing, and location of providing public services and facilities such as roads, water, and sewers, are major determinants of the pattern of land use. Their availability or lack thereof often directly encourages or discourages development. Extending urban services into coastal recreational, agricultural, and wildlife areas would make possible development that might not otherwise occur. Excessive expansion of services in already-urbanized areas can result in additional development to the extent of creating unwanted congestion and impeding public access to the coastline. Programming service provision in accordance with land use objectives is necessary for balanced and orderly development. [I-f15]

POLICY

169. Regulate Provision or Expansion of Public Utility Services and Transportation.

Public utility services and transportation facilities, especially sewer and water systems and roads, shall be provided or expanded only to the extent that the location and amount of development and population that the systems will potentially serve is consistent with other Coastal Plan policies. Similarly, special districts or local governments should not be formed or expanded except where assessment for and provision of the service would be in accord with these policies. Where the physical effects of the expansion of the public service system itself are in conflict with Coastal Plan policies, service system expansion shall not be permitted, and development shall be regulated to assure that the capacity of the existing service system is not exceeded. All plans for major sewer, water, and road systems and assessment districts with the potential for adverse effects on coastal resources or access shall be reviewed by the coastal agency for conformity with the Coastal Plan. [I-p20] (See also the Coastal Land section on Water Supply Management and the Transportation chapter.)

Development in Hazardous Areas

FINDINGS

Certain Coastal Areas Are Hazardous for Development. Certain types of land areas are hazardous for development and therefore should be taken into account in locating future development. These include: (1) presently unprotected and undeveloped floodplains; (2) fault zones and other areas of high seismic risk; (3) tsunami (seismic sea wave) run-up areas, and (4) unstable soils, slopes, coastal cliffs, and bluffs subject to landslide and mudslides. [I-f4]

FLOODPLAINS

FINDINGS

Coastal Stream Flooding Provides Several Benefits. Minor flooding is a frequent occurrence; major floods occur less frequently but unpredictably. The beneficial roles of floods on coastal streams include the maintenance of salmon and steelhead spawning grounds; the continued supply of beach sands; the removal of vegetation choking the river channel, restoring the channel's capacity to contain minor flood flows; the long-term deposition along the floodplain of sediments that provide highly fertile soils; flushing of undersirable salts from the surface layers of soils; and the preservation of valuable plant communities on overflow lands, such as giant redwood groves. During flooding, floodplains augment the streambed's normal capacity and provide a temporary storage area for flood waters. Uncontrolled development in the floodplain diminishes both of these functions. [L-f11]

Flood Damage Results from Poorly Conceived Uses of Floodplains. The loss of life and property damage caused by floods is due in large part to man's poorly conceived uses of the floodplain. Because clearing of vegetation and surface paving of areas reduce the pervious surface area, they can contribute to the intensity of flooding. Buildings, bridges, and other obstructions in the floodplain back up the flood water until those obstructions are swept away. Demolished structures may then contribute hazardous debris and pollution downstream. The cumulative effect of many small structures reduces the floodplain's storage capacity. Along with changes in hydrologic characteristics of the watershed, such reduction may increase velocity of flood waters, thereby diminishing seepage necessary for groundwater recharge. [L-f12] Flooding may also destroy valuable habitat areas and kill wildlife.

The Need to Restrict Floodplain Development Is Increasingly Recognized. In the past, emphasis has been on flood control projects that often ignore the beneficial aspects of floods. Public policy is increasingly recognizing that floodplains should be developed only for uses that can endure periodic flooding and that will not contribute to the flood hazard. The flood insurance program of the U.S. Department of Housing and Urban Development offers incentives and will soon include sanctions to encourage local governments to restrict uses on the floodplain. On the State level, the Cobey-Alquist Floodplain Management Act now requires establishment of floodplain regulations as a condition

of State contributions toward the cost of lands, easements, and rights of way for local flood control projects.

Costly Flood Control Projects Can Be Avoided by Floodplain Controls. Substantial public funds can and should be saved by early planning which permits acquisition of right-of-way before land costs escalate and by land use regulations which eliminate the need to build costly protective structures. Additionally, flood insurance premiums and federally subsidized insurance monies can be reduced by preventing inappropriate floodplain land uses. Because floodplain land use policies (or lack of policies) in one community can endanger communities at far distant points, inter-agency liaison is necessary as well as an established regional authority for consistent application of policies. [L-f13]

POLICY

170. Restrict Development on Floodplains. Development on floodplains shall be restricted.

- a. Requirements for New Developments on Unprotected Floodplains. Only new developments that can sustain periodic flooding and that will not create public burdens by aggravating the flood problem or impeding the storage capacity (for example, some agriculture and recreational uses, including incidental structures) shall be allowed on presently unprotected floodplains.
- b. Restrict Use of Floodplains during Flood-Prone Periods. During flood-prone periods, floodplains shall not be used for log decks or storage of materials that can be carried downstream by flood waters unless mitigation (such as anchoring devices or berms) can be demonstrated to be adequate.
- c. Review Floodplain Projects Outside the Coastal Zone Which Could Affect Coastal Zone. A procedure shall be developed by which affected persons and agencies could review and comment upon proposed projects located in floodplains that are outside of the coastal zone but upon which projects would affect the coastal zone. [L-p7] (See also Coastal Land section on Coastal Streams and Watershed Management.)

GEOLOGIC HAZARD AREAS

FINDINGS

Four Major Geologic Hazards Pose Substantial Risks to Human Life and Property.

The four major geologic hazards in the California coastal zone are earthquakes (ground shaking, rupture or liquefaction), tsunami (seismic sea waves) and storm waves, landslides and mudflows, and bluff and shoreline erosion, including loss of beach sands. All of these may involve substantial risks to human life or property. Subsidence of land areas can also pose major problems for development. Development that interferes with or ignores these natural geologic processes may impose direct or indirect danger and costs on the public and accelerate or aggravate long-term natural geologic processes of the coast. Of direct concern for shoreline management are the shoreline erosion processes; most of the others are of broad concern throughout the State. [G-f1]

Earthquakes Are Common in the Coastal Zone. Much earthquake activity in California occurs within the coastal zone, which is part of the earthquake-prone belt extending around the rim of the Pacific Ocean. The coastal area contains many complex fault zones. Ground shaking and liquefaction of certain soil materials (especially fill) can cause tremendous damage in addition to the rupture at the fault; however, proper engineering can overcome some of these hazards. [G-f2]

Earthquakes Are Unpredictable. Almost every section of the coastal zone has experienced earthquakes with various intensities. The recorded history of approximately 175 years is too brief, however, for definitive assessment of the earthquake vulnerability of any coastal section. In all areas, seismic activity is virtually certain, but it may not occur for centuries. Similarly, the absence of any high-intensity shock in any area in the past 175 years does not rule out earthquake possibility. [G-f3]

Definitive Studies of Earthquake Hazard and Probability Are Lacking. Definitive studies of earthquake hazard and probability are lacking. The technology of data collecting, processing, and interpretation is still in a state of development. Only the areas of recent high-level earthquake activity have been intensively studied. Instrumentation and seismic theory itself is in the process of continual revision. Maps of active fault areas only indicate a portion of the earthquake-prone areas in the State. [G-f4] Many earthquakes occur in previously unmapped areas.

Potential Earthquake Damage in the Coastal Zone Is Great. The scale of earthquake shaking hazard is indicated by the California Division of Mines and Geology projection of \$21 billion in damage statewide between 1970 and 2000 if the present rate of losses continues into the future. A large amount of this damage would occur in the coastal zone. [G-f5]

Tsunami and Other Sea Waves Can Cause Coastal Damage. Large-scale seismic sea waves (tsunami) in the Pacific Ocean Basin have caused some degree of damage along much of the California coast, such as the great waves that followed the 1964 Alaska earthquake. [G-f6] Nearshore earthquakes can generate localized tsunami, such as the Santa Barbara Channel event of 1812. [G-f7] Much damage can also occur as a result of waves and winds during great storms, as for example

the February 1960 storm in northern and central California. A combination of storm waves and high tide, or storm waves and a tsunami, or all three, could cause especially severe damage along the California coast. [G-f8]

Susceptibility to Tsunami Varies Along the Coast. Tsunami damage recurs in certain areas of the coast more than in other, since waves may be focused by the configuration of the ocean floor. Generally the coast north of Point Conception is more susceptible to Pacific Ocean events, while areas such as Santa Barbara and Santa Monica are more susceptible to locally-generated tsunami. Crescent City on the northern coast has been repeatedly damaged. Various areas of the southern coast from Santa Barbara to San Diego suffered minor damage from the great waves of 1964. Both these tsunami struck the southern coast at low tide; had high tide prevailed, damage might have been greater. [G-f9]

Identifying Areas of Probable Tsunami Risk Can Aid Land Use Decisions. Assessment of tsunami hazard on the California coast is based on a brief and partial history. No such assessment can anticipate future extraordinary events. However, identifying areas of probable tsunami risk can provide useful information for land use decisions. Limited mapping of possible runup areas in southern California is now under way by the U.S. Army Corps of Engineers for the Federal Flood Insurance Program (in part based on earlier work by the U.S. Geologic Survey). The California Division of Mines and Geology has outlined general areas vulnerable to tsunami along the coastline. Local and regional studies are often available to augment this information. [G-f10]

Many Landslides Occur in the Coastal Zone. Much of the landslide activity in California occurs in the coastal zone, due to the instability of the prevailing rock units and the steep-canyon topography of the coastal ranges. Many types of landslides, both ancient and recent, are observable, including rock falls, slides, and slow and fast mudflows, but many have been obscured by erosion and subsequent vegetation growth. Landslides and fast mudflows are caused by earthquake ground shaking, unstable rock formations, supersaturated ground material, torrential rainfall, and poorly planned development of landslide-prone areas. (For example, building on steep slopes, especially involving cuts and fills, may increase landslide risk if not properly planned). [G-f11]

Fast Mudflows Are Also a Problem in the Coastal Range. A special problem in the California coastal range is the potential for fast mudflows on canyon walls and on alluvial plains or canyon mouths. The potential for these mudflows is greatly increased by sudden heavy precipitation and by loss of ground cover, especially from fire. Revegetation programs after fire can help in reducing risks, but complete stabilization of these flow-prone areas is virtually impossible. In spite of this, these sites are often developed and suffer from later damage (for example, Topanga Canyon in southern California and the Big Sur area in central California). [G-f12] The California Division of Mines and Geology projects a statewide loss of \$10 billion due to landsliding in the 30-year period after 1970, much of which will occur in the coastal zone if the present rate of losses continues. [G-f13]

Slope Stability Hazards Can Be Minimized by Mapping and Regulation. Slope-stability mapping is a primary tool for assessing potential landslide hazard, while regulation of land use and site preparation is the chief means of minimizing slope stability hazards. At the present time, both mapping and regulation are incomplete within the coastal counties. Mapping has often been undertaken only when intensive development is contemplated and landslide hazard is suspected; however, the Division of Mines and Geology has or

is preparing maps for Sonoma, Marin, Santa Cruz, Ventura, Los Angeles, Orange, and San Diego Counties. Regulation is normally adopted only after damaging landslides occur. Slope-stability maps must be supplemented by specific analysis of individual sites if construction is proposed in areas indicated to be hazardous. [G-f14]

Subsidence is Also a Hazard in Some Coastal Areas. Subsidence is the relative sinking of the surface of the earth's crust in limited areas. This geologic hazard can be either natural or man-induced (primarily from overdraft of sub-surface liquids such as water and petroleum) and can break or shift many structures, such as buildings, transmission lines, and pipelines, and can cause inundation of beaches and low-lying areas. The South Coast Region has suffered and may still suffer from the greatest amount of subsidence in the coastal zone. The California Department of Mines and Geology estimates that statewide losses due to subsidence will total \$26 million between 1970 and the year 2000 if current practices are continued. Continuous monitoring of surface elevation changes and associated horizontal movements is necessary for early detection of subsidence. [G-f24] (See Policy 146 regarding measures to minimize subsidence hazard in petroleum extraction operations).

Legislation to Expand State Geologic Hazards Programs Has Been Recommended. The Joint Legislative Committee on Seismic Safety has recommended broadening the provisions of the Alquist-Priolo Act (which presently is limited to concern about construction on or near certain active fault traces). The Committee's four major recommendations are: (1) the Alquist-Priolo Geologic Hazard Zones Act of 1972 should be broadened to include all major geologic hazards (such as landslides, subsidence, tsunami, liquefaction, and ground shaking); (2) responsibility for setting criteria for and reviewing land use policies related to geologic hazards should be assigned to an effective State agency able to work with local governments. The proposed commission or agency would not conduct analyses of the geologic hazards of specific sites, however; (3) requirements for review of technical reports in support of construction proposals, called for in the Alquist-Priolo Act in general terms, should be clarified and specified; and (4) the Alquist-Priolo land use controls should be extended to cover State and Federal projects as well as those of local governments and the private sector. In related legislation in 1974, the Seismic Safety Commission Act was enacted, establishing an advisory Seismic Safety Commission. Legislation that would have required geologic reports for subdivisions in areas of high geologic risk (as designated by local Seismic or Safety Plan Elements) and in all areas of 2:1 slope or greater was passed by the Legislature but vetoed by the Governor. [G-f26]

POLICIES

171. Statewide Geologic Safety Measures Are Necessary. Measures to ensure geologically safe land use in California and particularly within the coastal zone are essential. [G-p1]

- a. Improve Local Government Geologic Hazards Programs. Local governments' seismic safety elements of general plans, and planning, funding, and im-

plementation of city and county geologic hazards programs should be improved. Legislation should be adopted requiring local governments to adopt, implement, and enforce at a minimum Chapter 23, dealing with earthquake-resistant design requirements, and Chapter 70, dealing with grading requirements, of the Uniform Building Code. Cities and counties should be mandated and funded to conduct geologic evaluations and to require adequate engineering specifications in order to assure site stability and structural safety for all proposed construction projects and subdivisions that are in areas identified by appropriate governmental agencies as being of moderate or high geologic hazard or for projects that involve public service facilities and high-occupancy buildings (e.g., police and fire stations, schools and hospitals, major utility and industrial structures, multi-story residential and commercial buildings). [G-pla]

- b. Strengthen State Role in Geologic Programs. The Legislature should enact legislation assigning, empowering, and adequately funding an appropriate State agency to designate geologic risk areas, to recommend and, where necessary, impose appropriate land use and building regulations related to the designations, and to establish criteria for local governments' specific review of construction projects in hazard areas. Appropriate improvements to the Uniform Building Code should be researched and recommended to both the International Conference of Building Officials and local governments. The State agency should be empowered to review and approve local seismic safety plans, land use policies, and building code standards and enforcement for consistency with statewide designations and goals. State funding assistance to the local government for disaster relief and other such programs should be contingent upon satisfactory geologic hazards policies and enforcement. The State agency should further be responsible for enforcing standards and site review for pro-

posed State projects and for advisory review of Federal projects. [G-plb]

The State agency should also compile and distribute to all appropriate State, regional, and local agencies, the large amount of pertinent data on geologic hazards being developed by such agencies as the State Division of Mines and Geology, U.S. Geological Survey, National Ocean Survey, U.S. Army Corps of Engineers, the Seismological Laboratory of California Institute of Technology, county and local governments, universities, colleges, and private organizations. This information should be fully utilized in the formulation of land use plans and building standards, and in development evaluations, including septic tank and erosion control considerations, affected by geologic conditions. [G-p2]

Regional Amplification

South Coast: The Newport-Inglewood, Palos Verdes, and the Santa Monica (including the Malibu Coastal) zones of faults shall be added immediately to the list now under special study as required by the Alquist-Priolo Geologic Hazards Zone Act. [G-plRA]

172. Prohibit or Prevent Public Liability for Hazardous Developments. In locations where serious geologic instabilities recur, or are identified by appropriate governmental agencies as having high geologic risks, new structures for human occupancy shall not be allowed, and there should be no public assistance for such construction or reconstruction, unless the risk to life and property has been substantially eliminated. State legislation should be enacted to assure that, if for any reason development proceeds with knowledge of high geologic risks but without the necessary precautions, there is no presumption of public liability for property loss (e.g., disaster loans or forms of insurance borne by the general public) and all occupants of such structures should be advised of the hazard. No development in such locations shall be allowed unless the applicant has signed a waiver of public liability for loss caused by a geologic event and the document is recorded so as to notify all successor purchasers of the structure. [G-p4]

173. Require Filing of Geologic Hazards Information. Geological hazards information developed by qualified personnel and approved by an appropriate governmental agency for general areas or for specific sites should be permanently filed at the coastal counties. The full reports should be cited and a summary of all relevant conclusions, understandable to the layman, should be included as part of the chain of title to property (and be a normal part of a title report) and also as part of the State Real Estate Commissioner's report for subdivisions. [G-p3]

174. Review New Developments for Geologic Safety. All proposed structures for human occupancy and other developments that could significantly alter geologic processes or contribute to hazards in designated areas of high risk and in areas of unknown risk shall be reviewed.

- a. Project Review Procedure. Where such project review is necessary, geologic and soils reports of the site prepared at the applicant's expense shall be required unless adequate and currently applicable information is already available.
- b. Coastal Agency Review. Project review shall be by the coastal agency or an agency designated by it to carry out this function subject to independent review by the coastal agency within its permit area. (For example, some local governments are or may become adequately staffed and authorized to perform project review, and the Forestry Board may adequately review potential hazards of timber operations).
- c. Division of Mines and Geology to Assist. The Legislature should enable and fund the Division of Mines and Geology to serve in an official advisory capacity to the coastal agency to assist as necessary in project review. The Division should have a review team available, where necessary, with expertise in geology, seismology, coastal processes, oceanography, soils

engineering, engineering geology, structural engineering, civil engineering, architecture, landscape architecture or coastal botany, and building code enforcement. The team may include personnel from other State agencies as well as local experts. The coastal agency may also establish advisory boards to supplement this agency assistance. [G-p5]

- d. Definition of High Hazard Areas for Development. Areas of high geologic hazard include: (1) seismic hazard areas delineated on fault maps as subject to potential surface rupture, on soils maps indicating materials particularly prone to shaking or liquefaction, and in local and regional seismic safety plans; (2) tsunami runup areas delineated by U.S. Army Corps of Engineers' 100-year recurrence maps, by other scientific or historic studies, and other known areas of tsunami risk; (3) landslide hazard areas delineated on slope stability maps, and in local and regional geologic or safety plans; (4) bluff and cliff areas designated as unstable (see Policy 177); (5) beach and dune areas that are subject to erosion; and (6) any other geologically hazardous areas so delineated by the Coastal Plan maps or the coastal agency. [G-p6]

Regional Amplification

South Coast: Areas in the Santa Monica Mountains, the Pacific Palisades, the Palos Verdes hills, and Orange County coastal hills are considered high hazard areas; development shall not be permitted without a report evaluating faults, landslides, slumps, soil and rock creep, mudflows, drainage, erosion, and other factors affecting safety and stability. [G-p6RA]

175. Development Guidelines in Geologic Hazard Areas. Development in geologic hazard areas of the coastal zone shall be carefully regulated to avoid risks to life and property, as follows:

- a. Interim Land Use Designations. Pending more precise data and land use regulations, appropriate land uses, such as agriculture, forestry, sand

and gravel mining, outdoor recreation, and parking lots, shall be encouraged in all currently undeveloped areas of high geologic hazard. [G-p6]

- b. Criteria for Development in Hazard Areas. Proposed structures for human occupancy or developments that could contribute to potential hazards, such as cuts and fills in landslide areas, shall be permitted in high geologic hazard areas only if it can be demonstrated that site treatment and construction techniques are adequate to overcome the hazard. Proposed site and construction measures must be consistent with other Coastal Plan policies.
- c. Public Buildings in Hazard Areas. All existing public buildings within high hazard areas should be phased out or adequately protected as soon as possible.
- d. Restrict Reconstruction in Hazard Areas. In locations where structures have been rendered unfit for human occupancy by geologic instabilities, reconstruction shall be prohibited unless geologic and engineering data on the site demonstrates that the structure will not be rendered unfit for human occupancy in the future by the same type of geologic event. [G-p6]

176. Prepare for Tsunami Occurrence. Communities within the 100-year tsunami (seismic sea wave) runup zone should include within their safety elements a disaster preparedness plan for a tsunami occurrence; such a plan shall include evacuation routes and an effective emergency warning system capable of adequately informing all residents and visitors of an impending tsunami occurrence.

Based upon accumulated information, the Department of Navigation and Ocean Development should establish and enforce standards for marinas and harbors, including debris clearance and emergency evacuation procedures, to reduce potential damage from tsunami occurrences, subject to coastal agency review and approval. [G-p6]

BLUFFTOPS

FINDINGS

Bluff Erosion Is Caused by Natural Processes and Human Activities. The breakdown of seacliffs and bluffs by wave action is a natural and constant process, the rate of erosion depending on such factors as the resistance of the cliff material, the conformation of the shoreline, the height of the cliff, the erosion from upland areas, and the direction of approach, height, and frequency of waves. Much of the coast consists of terraces of former beach sand overlying a bedrock; the sand layer is very erodible. In addition to natural causes, cliff erosion can be accelerated by saturation from irrigation or other increased water runoff at bluff tops, disruption of surface materials (for example, by foot traffic over bluffs), undercutting of the base, removing sand or rock materials that protect the base, loading by structures on the top, and improperly designed walls or stairways down the bluff face. Runoff water and saturation can be the major source of cliff and bluff erosion in many areas where landscaping and irrigated fields have been permitted on bluff tops. In many cases, drainage could be directed away from the bluff to correct this problem. [G-f15]

Natural and Artificial Measures Can Protect Bluffs. The best natural defense of seacliffs against wave action is a fronting beach that is both high and wide. Areas of seacliff lacking natural protection can be preserved by artificial means, such as (1) construction of a beach seaward of the cliffs; (2) armoring the cliff with rock or other non-erodible material; (3) construction of offshore reefs or breakwaters to reduce wave energy that reaches the cliffs; and (4) construction of cliff retaining walls.

Bluff Protective Works Are Costly and Involve Problems. However, these measures can be extremely costly, may be unsightly in the case of retaining walls, may interfere with access along the shore, may require continual sources of sand for replenishment, and must be carefully engineered to avoid beach erosion and shoaling elsewhere along the shoreline. [G-f16] A decrease in sand supply (especially affecting pocket beaches) also may result in some cases when artificial protective measures interfere with natural bluff erosion processes. [G-f20]

Avoiding Extensive Protective Works Requires Control of Development. The best means of avoiding the many problems associated with construction of bluff protective works, including public costs and visual impact on the natural landforms of the coast, is to limit construction on or near bluffs that might eventually require such works. Some additional protective works may be required, however, for certain public service facilities and for protecting existing structures. [New finding]

POLICY

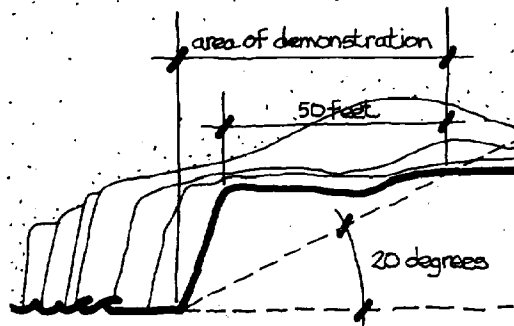
177. Regulate Bluff and Cliff Developments for Geologic Safety. Bluff and cliff developments shall be permitted only if it can be demonstrated that design and setback are adequate to assure stability and structural integrity for the

expected economic lifespan of the development and that the development (including storm runoff, foot traffic, grading, irrigation, and septic tanks) will neither create nor contribute to erosional problems or geologic instability of the site or surrounding area. Design solutions shall in no case include destruction of cliffs and bluffs by excavation or other means. Bluff protection works may be permitted only for public service facilities or for existing endangered structures and only if consistent with other Coastal Plan policies. (See Policies 18 and 53). No new lot shall be created or new structure built that would increase the need for bluff protection works. [G-p7]

- a. Expert to Evaluate Site Stability. The demonstration of stability shall include a report prepared by a registered geologist, a professional engineer specializing in soils engineering, and/or a certified engineering geologist acting within their areas of expertise, based on an on-site evaluation. The report shall consider (1) historic cliff erosion, (2) cliff geometry, (3) geologic conditions, including soil and rock characteristics, (4) landslides, (5) wave and tidal action, (6) ground and surface water conditions and variations, (7) potential effects of earthquakes, (8) the effects of the proposed development, and (9) any other factors that may affect slope stability. The report shall express a professional opinion as to whether the site and development will meet the above standards during all foreseeable normal and unusual conditions, including ground saturation and maximum 100-year probable seismic forces (using best available information), throughout the lifespan of the project. The report shall use a currently acceptable engineering stability analysis method and shall also describe the limitation in this professional judgment due to assumptions and unknowns in the analysis. The degree of analysis required should be appropriate to the degree of potential risk presented

by the site and the proposed project; no significant risk to human life shall be acceptable.

- b. Area of Stability Demonstration. As a general rule, the area of demonstration shall include the base, face, and top of all bluffs and cliffs (of 10 feet in height or greater measured from the toe of the cliff face)



extending inland to a line formed by a 20-degree angle from the horizontal plane at the base of the cliff or bluff (a 2.75:1 slope) or 50 feet from the top edge of the cliff, whichever is greater. However, the coastal agency may de-

signate a lesser area of demonstration in specific areas of known geologic stability (as determined by adequate geologic evaluation and historic evidence) or where adequate protective works already exist, and may designate a greater area of demonstration and/or an area of absolute development exclusion in areas of known high instability. [G-p7]

Regional Amplifications

Central Coast: In low stability areas, any proposed development must be excluded from the area of 1:1 (45°) slope from toe to top of bluff and from the area of active movement. Low stability areas are defined as those with: (1) greater than one foot/year cliff retreat; or (2) landslides or other inherently unstable material (such as beach sand or active sand dunes). Areas currently considered to be unstable are indicated on the maps in Part IV. Designation of these areas may change as additional information becomes available. [G-p7RA]

South Central: Any significant changes in loading, grading or filling in a bluff area, as determined if possible by a local planning agency in consultation with qualified engineers, shall require justification by a qualified engineer or geologist. Before any construction is permitted in a bluff area, an adequate drainage plan must be presented. In projects involving 3,000 square feet or more of floor area together with paved areas, said plan shall be prepared by an engineer. All surface runoff, including streets and paved areas, shall be drained away from the bluff face, or ample conduit capacity provided to carry this water to the toe of the bluff. No septic tank shall be allowed closer than 50 feet from the 2:1 plane of the equilibrium slope. Landscaping shall consist of plant species that will

tend to limit the possibility of percolation deep into the soils of the bluffs. [New RA] (See also regional amplification in Appearance and Design policy regarding bluff development and structures.)

* *

Regional Amplification to the Development Chapter

South Coast: Following are interpretations of the Intensity of Development Policies in the South Coast Region as adopted by the South Coast Commission. These have not been reviewed by and are not adopted by the State Commission pending such review, but are included here for illustrative purposes. They should be read in conjunction with the South Coast subregional descriptions beginning on page 331.

Subregion 1--Malibu: This area should be designated as a nonurban area with priorities focused on open space, recreation, and agriculture. No major employment centers such as industry, service facilities, and regional shopping centers or other population generators should be permitted. Undeveloped land in the immediate shoreline area, between the beaches and Pacific Coast Highway, should be acquired by the public and used primarily for recreation, physical access, and visual access from the highway. Low rolling hill areas inland from the Pacific Coast Highway, such as Lower Malibu Canyon, may accommodate low density residential and institutional uses in planned communities retaining maximum open space. The higher hills should be generally planned for very limited low density residential uses in planned communities in designated locations. Places of special aesthetic value, such as Point Dume headland, or active recreation value, such as the beaches below the bluffs at Point Dume, should be acquired for public use at an early date. Commercial uses should be limited to planned commercial clusters inland of Pacific Coast Highway. Improvements in roads, water and sewer service should be designed and implemented to maintain a nonurban character as well as safety; such improvements should not stimulate population growth or accommodate unacceptable patterns of development.

Subregion 2--Santa Monica: No intensification of land uses in areas of Venice, severely impacted by traffic congestion, should be permitted unless measures to relieve the congestion are undertaken. No intensification of land uses in the Marina del Rey area should be permitted until the problems of adequate public access and open space, traffic congestion, and land use priorities are solved through local and State agency coordination. Recycling of residential land uses should be compatible with neighborhood character and the maintenance of social diversity, particularly in Venice and Ocean Park. Recycling at the same densities and rehabilitation of older housing should be encouraged. A 40-foot wide linear park adjacent to the east side of Ballona Lagoon and the north side of the main channel should be acquired, pedestrian and bicycle routes provided adjacent to the lagoon, and additional parking and open space on the west side of the lagoon should be provided to the extent feasible.

Subregion 3--LAX-El Segundo: Stable, single-family neighborhoods should be preserved and protected from pressures for recycling to higher densities. Adequate buffers should be maintained between residential areas and incompatible uses, such as Los Angeles International Airport and industrial areas. The undeveloped land in the Ballona Creek area should be maintained for

habitat open space and compatible recreational uses. Noise, air, and water pollution should be controlled to a greater degree and the visual appearance of industrial areas enhanced.

Subregion 4--South Bay: Residential recycling and rehabilitation should be encouraged at existing densities, retaining opportunities for social diversity. No intensification of residential uses that are incompatible with the existing character, or with the ability of the transportation, water, and sewer systems to provide an adequate level of service, should be permitted. Commercial uses should be encouraged to concentrate in inland centers incorporating pedestrian circulation and coastal access. No development, whether private or public, should be permitted to inhibit free access to the shoreline.

Subregion 5--Palos Verdes: Most of the remaining undeveloped areas seaward of the Palos Verdes Drive West and South should be used for very low density residential projects providing substantial permanent open space for recreational and view corridor purposes, the preservation of prime agricultural soils, and protection from geologic hazards. No new major employment centers, such as industry and service facilities which would encourage significant increases in population growth or traffic generation, should be permitted. Residential and commercial uses should be permitted in planned clusters assuring maximum retention of open space. Single family residences on large lots that, with adequate control of grading, preserve the natural land contours and scenic qualities of the area should be permitted. Commercial uses should be generally limited to neighborhood and community uses. Regional shopping centers should be prohibited unless the transportation system can adequately support their needs. The protection of bluffs should be a major priority.

Subregion 6--Harbor Area: Industrial development in the port facilities should be limited to coastally dependent or related uses. Increased public facilities for recreational access should be provided to the shoreline and harbor area subject to the maintenance of public health and safety, port security, and where it does not interfere with cargo operations. Opportunities for low and moderate income families and minorities to reside in and to enjoy recreational facilities in the harbor area should be protected and expanded. Tourist commercial uses and marina and small craft storage areas in specially designated areas of the harbor where there is minimal conflict with port functions should be permitted. Linkages by public ferries and bicycle and pedestrian paths between San Pedro and Alamitos Bay should be developed, consistent with public safety and port security in cargo handling areas. No additional landfill of the harbor should be permitted for port operations and industrial uses as long as existing land suitable for the proposed use is available or underutilized. Fort MacArthur should be maintained in public ownership, primarily for recreational and institutional uses. The unique characteristics of the San Pedro area should be enhanced and protected.

Subregion 7--Long Beach: Residential development should include units designed for a wide range of income and age groups. Recycling and rehabilitation of residential areas at the same densities should be encouraged. Increased public access to beaches and linkages between the central business district and harbor and Alamitos Bay should be provided. Intensification

of land uses around Alamitos Bay should be permitted only if adequate concurrent measures to handle traffic are required and appropriate measures implemented to safeguard the water quality of the bay. Major open space and vista points should be incorporated into recycled land uses on Signal Hill.

Subregion 8--Islands: Coastal hill areas should be retained in permanent open space for recreational purposes to the maximum extent possible. In the unincorporated areas residential uses should be permitted only in a few clustered, planned communities, primarily for the resident population. Riding trails and other public recreational facilities should be incorporated in permanent open space areas. Design standards should include emphasis on pedestrian and transit circulation, and automobile usage should be prohibited or discouraged. Small craft anchorages and marinas should be provided where environmentally sound. The distinctive character of Avalon and other settlements on Catalina should be maintained.

Subregion 9--North Coast: No development of Bolsa or Anaheim Bays or surrounding lands that would seriously impact the ecological preserves shall be permitted. Open space for wildlife habitat and recreational uses should be restored and maintained from the Santa Ana River mouth to Victoria Street and in the vicinity of the Edison and sanitation district plant facilities, as is presently proposed in the Santa Ana River Greenbelt Plan by Orange County. Strip commercial uses along Pacific Coast Highway should be redeveloped into planned commercial clusters. Recycling and rehabilitation of residential areas at the same densities should be encouraged. Opportunities for low and moderate income families and minorities to reside in the area and enjoy recreational facilities should be protected and expanded. Bluffs should be protected; vista points should be provided and incorporated into public open space when feasible. Public open spaces should be incorporated into residential and commercial areas. No intensification of land use should be permitted which is incompatible with the existing character of development. The nine-acre property of the City of Los Angeles Department of Water and Power and the mouth of the San Gabriel River should remain in public ownership and should be primarily for open space/recreation uses.

Subregion 10--Newport/Mesa: Upland areas adjoining Upper Newport Bay should be publicly acquired for recreation uses compatible with the wildlife preserve. Undeveloped land at the Santa Ana River mouth to Victoria Street should be acquired as a regional park for public recreation and wildlife habitat. No intensification of uses should be permitted in areas severely impacted by traffic congestion. Visual and physical access to Lower Newport Bay should be improved. The boat maintenance and repair industry should be protected from displacement. Inland parking areas served by public transportation to the beaches should be provided.

Subregion 11--Irvine: Land between the Pacific Coast Highway and the shore should be limited to permanent open space for active and passive public recreation, including highway view corridors, and to planned clusters of water-oriented resort, recreational and tourist uses, such as restaurants, hotels, and boating facilities which serve the general public. The remaining lands on the coastal shelf which are not specified as critical resource conservation areas may be utilized for low density, clustered residential uses and related commercial and institutional uses. In the

hillside area above the coastal shelf, the steep slopes, deep canyons, and very narrow ridges should be primarily limited to open space uses. The gentle slopes, elevated terraces, and broad ridges may be utilized for low density residential communities including related commercial and institutional uses provided these uses are located and designed in a way to protect the sensitive natural resources. Vista points of special aesthetic significance should be developed for public access and use. No commercial use abutting Pacific Coast Highway should be permitted. All commercial uses should be restricted to carefully selected sites, to serve residents and visitors as appropriate.

Subregion 12—Lagunas: Undeveloped lands seaward of Pacific Coast Highway that could provide significant open space recreational opportunities, vistas or view corridors, and/or commercial recreation facilities such as resorts, hotels, and campgrounds that serve the general public should be acquired by the public. No major commercial centers, industry, or service facilities, which would generate significant increases in traffic congestion should be permitted. New commercial uses should be limited to planned commercial clusters inland of Pacific Coast Highway. Residential uses should be permitted in the lower hill areas with maximum retention of open space. The higher hills should be generally maintained in open space use with only very limited low density residential uses in selected locations. Pedestrian access to tideland areas should be provided through private communities.

Subregion 13—South Coast: Undeveloped land above and immediately adjoining the coastal bluffs should be primarily limited to low density development and where possible open space uses for public recreation and view corridors. No major employment centers or other population generators should be permitted until traffic congestions can be resolved. Vista points and bluff top walkways should be provided for public access. Residential and commercial uses should be permitted in the lower elevations in planned clusters to maintain maximum open space. The higher hills should be generally maintained in open space use, with only very limited low density residential uses in designated locations. The railroad abutting the beaches from San Clemente to Dana Point should be relocated when appropriate. Removal of housing and trailers from the beach sands should be undertaken through public acquisition. Prior to this action, public access to the beach area should be sought through negotiation. Pending a determination of the natural environment and the impact on population growth levels which implementation of adopted policies for coastal resource management will have, the coastal agency should use the adopted allocations of the Southern California Association of Governments to guide the population growth in the coastal zone. As an interim policy, the SCAG allocations should be set as the maximum desirable population level and used to phase development. A lower level or rate of population growth in coastal communities should be considered consistent with this interim policy.

Restoration of Coastal Resources

FINDINGS

Incompatible and Adverse Coastal Developments Can Be Eliminated. Many parts of the coast have been degraded by past development, both public and private. Incompatible or harmful developments include those that generate substantial pollution, degrade or reduce wetland areas and coastal agricultural lands, block important views of or access to the coast, cause beach erosion, adversely affect marine life, or degrade coastal neighborhoods. These degraded resources can be restored, as mandated by the Coastal Act, through several courses of action, including: (1) public purchase and restoration of natural areas and the creation of public recreation areas, (2) consolidation of existing small lots into parcels compatible with the Coastal Plan, (3) phasing out developments that are inconsistent with the Coastal Plan, (4) encouragement of new development that is consistent with the Coastal Plan, and (5) rehabilitation and redevelopment.

Small Lot Coastal Development Can Impact Coastal Access and Resources. Vast amounts of coastal land have already been subdivided and sold to many individuals. In many areas of the coast, the number of existing lots that can be developed piecemeal can have a cumulative effect on coastal access and coastal resources comparable to large subdivisions developed at one time. [I-f11]

Some Blighted Coastal Areas May Require Redevelopment. Rehabilitation efforts can restore many blighted areas of the coast. If efforts to rehabilitate blighted areas are unsuccessful, the redevelopment of such areas can: (1) generate revenue necessary for improved public services and amenities, (2) provide for the assembling and consolidating of subdivided lands for orderly development as an alternative to fragmented lot-by-lot development, (3) enhance urban design and public access to the shoreline, (4) implement the adopted development goals of the Coastal Plan and community plans, and (5) provide housing opportunities for a wide variety of income groups. [I-f19]

Many Potential Coastal Recreational Areas Have Been Lost. Potential recreational areas for active use by the general public and scenic open spaces (such as agriculture, forestry, and grazing lands) that enhance the recreational quality of the coastline have been lost because the assessment of land for property taxation purposes has often been based on the land's speculative market value (e.g. for residential or commercial development) rather than its present use value (e.g. for agriculture). Such property taxes can economically preclude the continuation of existing non-intensive uses. However, recently enacted legislation (AB 4107, passed in 1974) requires that the effect of development restrictions imposed by government agencies (including the Coastal Commissions) must be considered in the assessment of land values. [R-f5a]

POLICIES

178. Restore Lost or Degraded Coastal Resources. Lost or degraded coastal resources shall be restored or enhanced wherever possible. [I-plf] Coastal

areas that have been despoiled by landfill operations, industrial uses, pollution, or other activities that have destroyed the natural character of the area shall be restored or reclaimed for natural resource values or recreational use. [R-plf]

179. Restoration Measures Desired as Part of New Development. New developments shall be required to restore coastal resources on the same parcel if the opportunity exists, and developments that offer the substantial restoration of significant coastal resources (e.g. restoration and replenishment of wetlands and wildlife areas, removal of damaging uses, improvement in public recreation) shall have priority over other development wherever the option exists. [I-p23]

180. Restoration Measures Required to Offset Environmental Damage. Where coastal-dependent development must degrade an important natural coastal resource, the developer shall be required to restore or acquire and dedicate to the public an equivalent resource area (preferably in the same jurisdiction). Where the developer is an organization other than a port, public utility, or other public entity, appropriate financial security shall be required to assure the completion of the necessary resource restoration or protection activity. [I-p8b]

181. Resubdivide in Certain Areas. Where full development of existing small lots near the coast would adversely affect the preservation of coastal resources or impede public access to the coast, despoil coastal views, or be more costly to the public because of the public investment in roads and other facilities to serve such areas than the public purchase of the land, the number of lots should be resubdivided and relocated or reduced by (1) incentives to owners or investors to consolidate lots, (2) requirements that lots remaining in common ownership be consolidated, or (3) public acquisition when necessary. [I-p25]

182. Restore Visually Degraded Coastal Areas. Coastal areas that have been degraded by alterations of the natural landforms and vegetation, signs and bill-

boards that block views and create visual clutter, and development that is mediocre in design and out of character with the unique coastal environment shall be restored to a high visual quality. To this end: [A-p3]

- a. Prepare Long-Range Restoration Plan. The coastal agency, working with local municipalities and citizens, shall prepare a long-range plan for the restoration of the desired visual quality and character of degraded coastal areas, including detailed design criteria consistent with Coastal Plan appearance and design policies. Public funds shall be provided to restore coastal design amenities and to assist local municipalities in developing restoration plans. All new development shall be compatible with the long-range restoration plan. [A-p3a,b,c]
- b. Redevelopment of Blighted Areas May Be Necessary. If approved restoration plans determine that rehabilitation efforts are not adequate to relieve blighted conditions in urban areas of the coastal zone, the redevelopment of such blighted areas by local governments, consistent with the policies of the Coastal Plan, should be encouraged through the provision of State and Federal financial assistance programs. [I-p24]

Regional Amplification

South Coast: Public acquisition of properties that are non-conforming uses should be considered at such time as local zoning requires their conversion or when they suffer damages totaling 50 per cent or more of their replacement cost. [A-p3RA]

Subregional Planning

FINDINGS

Need for Cumulative Impact Assessment of All Coastal Zone Development. In some coastal areas, development has been so rapid and extensive that its cumulative effects could not be fully understood until it was substantially completed. For example, many small subdivisions and lot splits may be approved and gradually built up before it is discovered that road capacity has been exceeded, thereby impairing coastal access or forcing the construction of an environmentally damaging and costly road expansion. Coordination of the timing, size, location, and type of development is often difficult because of fragmentation among the large number of local governments, special districts, public utilities, and regional, State, and Federal agencies involved in land use and public service decisions. Without an assessment of cumulative impacts and coordination among various agencies, local governmental agencies often have no choice but to respond to development pressures rather than to guide the pace and location of development so as to protect coastal resources. [I-f16]

Population Densities Affect Coastal Resources and Their Use. In many areas of the coast, development beyond a certain population or density will adversely affect the preservation of coastal zone resources or access to the coast through the direct effects of development itself (e.g., the conversion of agricultural lands or the congestion of coastal access roads) or through the impact of services necessary to serve new development (e.g., the construction of new or widened roads). Conversely, higher population densities in other areas of the coast (e.g., the downtown area of major cities) could take place without adverse impacts on resource preservation and access policies if sufficient public services (including public transit and recreation areas) are provided to serve the new development.

Setting of Population Densities Needs Precise Area Analysis. The Coastal Act requires the Coastal Plan to contain "a population element for the establishment of maximum desirable population densities." Precise population limits, including both ultimate amount and location, cannot now be established for all coastal regions. To do so requires precise analysis of each area now developed or proposed for development in light of the specific resources in the area that need protection and the access needs and problems. With information that is currently available, specific development concerns (e.g., the need to protect agricultural lands from conversion or to keep development from exceeding road capacity) can be identified for particular geographic areas of the coastal zone. However, translating development concerns into precise determinations of the rate, type, location and pace of development is a complex and continuing process that involves detailed planning and close cooperation with local governments, since they control zoning, the provision of public services and open space acquisition. Setting of population densities therefore must be a continuing responsibility of the coastal agency. [I-f24]

Subregional Plans Provide Planning Overview. Certain subregions of the coast are experiencing complex development problems, such as degradation and depletion of natural resources, restricted access, and transition to more intense uses resulting in increased congestion and degradation of community character that

are difficult to resolve on a project-by-project basis. Similarly, within these areas there often exists a distinct potential to preserve and enhance unique natural resources and/or to create imaginative, high-quality, man-made environments. Because of the unique nature of each such area, what is needed are plans for subregions of the coastal zone. The subregional plans, many of which can be completed during the life of the present Coastal Commissions, would provide the basis for specific plans or other implementation programs prepared by each concerned local jurisdiction. (See Part III, Carrying Out the Coastal Plan). [I-f25]

POLICIES

183. Subregional Plans Should Be Prepared for Some Coastal Areas. Subregional plans should be prepared in a joint effort of the Commissions or the coastal agency and local governments, regional agencies, other State agencies, and citizens groups for coastal areas where the cumulative impact of development over time has the potential for adversely affecting coastal resources or coastal access. These plans shall apply Coastal Plan policies to subregional areas in order to establish development alternatives that are consistent with the Coastal Plan.

- a. Boundaries for Subregional Plans. The boundaries for such subregional plans should be based on natural geographic features (e.g., major valleys), important public services (e.g., a coastal road network), and situations where development occurring in more than one local jurisdiction would have a cumulative impact on resources and access. (In most cases, these boundaries correspond with the subregions designated in Part IV).
- b. Means of Establishing Development Alternatives. The subregional plans should: (1) define the nature and extent of the current commitment to development; (2) analyze the changes that would result in these development patterns if Coastal Plan policies oriented toward specific types of resources (e.g., agricultural lands, estuaries, coastal neighborhoods) are applied; (3) examine the implications of these different patterns of development for coastal access, public services, and other Coastal Plan

policies (e.g., concentrate development); (4) determine the alternatives that are consistent with the Coastal Plan; and (5) create a system for monitoring the effectiveness of subregional plans in protecting resources and preserving access.

- c. Goals of the Assessment of Development Alternatives. The assessment of development alternatives should attempt to: (1) resolve questions about the type of development that should have priority in specific areas; (2) indicate where density shifts (including increases or reductions) could or should occur, including setting the limits of urban development, where appropriate; [I-p26] (3) determine the relative ability or inability of particular coastal resource areas to tolerate development, where it is not designated in the Coastal Plan; [I-p3] (4) indicate the conditions that must accompany different levels of development (e.g., open space necessary to serve new development, improvements in transportation systems required beyond a certain level of development); and (5) define conditional uses appropriate for specific sensitive resource areas. [I-p26] The possibility and desirability of categorizing coastal resources for the purpose of establishing appropriate development guidelines should also be investigated as part of the subregional planning program. [I-p3]
- d. Localities Should Refine and Apply Subregional Plans. Once subregional plans have been adopted by the Coastal Commission or by the coastal agency, local governments may prepare plans for individual jurisdictions based on one of the acceptable alternatives. Such plans should include, as appropriate, capital improvement budgets for public services, specific programs for acquisition of public open space and recreation facilities, specific programs for improved public transit, preservation programs for coastal resources (e.g., agriculture), appearance and design guidelines, and restoration programs for natural and man-made resources.

- e. Provide State Funding For Subregional Planning Programs. State grants should be made available for this work in a new program similar to the Federal 701 planning program. [I-p26]

EXAMPLES OF SUBREGIONAL PLANS AND THEIR POTENTIAL

In most coastal areas, there is no effective system for identifying the potential cumulative impact of many local decisions regarding public services and development as they will ultimately impact upon coastal resources and coastal access. What is needed is a method of assessing potential long-term impacts before commitments to specific patterns of development are made and identifying alternative development patterns that would not adversely affect coastal resources or access.

Subregional plans could sensitively apply Coastal Plan policies to specific geographic areas of the coast. Subregional plans could provide the planning certainty being demanded by both environmentalist and developers. For concerned citizens, a system of subregional planning would allow a concentration of effort on relatively few plans rather than the exhausting process of following every potentially adverse permit request. For developers, it would provide the certainty necessary to carry through projects in a time of rapidly changing money markets. For local governments, such a planning process would provide a means of participating in the elaboration of Coastal Plan policies and of understanding the impact of regional coastal development patterns on their own jurisdiction. A major opportunity would be afforded for joint efforts by local governments, citizens, other public agencies, and developers in defining alternative development patterns that would respect coastal resources and access concerns consistent with Coastal Plan policies. To be successful, the planning process must have the complete involvement of affected local governments and concerned citizens. A byproduct might be a reduction in the amount of environmental litigation, much of which now results from the inadequacy of evaluating the impact of projects on a case-by-case basis.

The planning approach suggested below could be applied to the subregional areas described in Part IV or to some special study areas defined in the Coastal Plan. Two case studies and sample subregional issues are summarized below to help in understanding and evaluating the proposed planning approach.

Preliminary work on the two case studies suggests that a five-step process is required to establish alternatives to existing development trends. These five basic steps are: (1) define the nature and extent of the current implied commitment to development on the basis of local zoning and ownership patterns; (2) use Plan maps delineating coastal resource and hazard areas to analyze the extent to which coastal protection and geologic hazards policies will affect the amount and location of development in specific coastal areas; (3) project alternative capacities for future stages of road, sewer, and water system expansions and then the land uses and population levels associated with each level of expansion of these systems in order to assess the potential impact on coastal resources and coastal access; the key decision points and alternatives concerning the amount and location of services would be spot lighted; (4) using

the information from the first three steps, apply development policies (concerning density, concentration, man-made resources, etc.) to determine alternative development patterns that would be consistent with all Coastal Plan policies (these alternatives would attempt to determine development priorities for specific areas, identify where density increases or reductions should occur, and indicate precautions necessary to protect specific sensitive resource areas); and (5) create a monitoring system for evaluating the effectiveness of this planning process in protecting resources and preserving coastal access.

The following summaries of case studies indicate how this approach would apply in a heavily-urbanized area and in a low-density, rural area. Due to lack of time, the two case studies did not employ the active collaboration with local government and citizens groups that would be necessary in preparing such plans for actual adoption. Therefore, they should be regarded as a preliminary test only. However, local governments and other public agencies in both subregions cooperated by providing extensive information and reports.

HALF MOON BAY CASE STUDY

The Half Moon Bay study area covers 58 square miles and includes the City of Half Moon Bay, the unincorporated communities of Montara, El Granada, and Moss Beach, and rural lands in San Mateo County. Devil's Slide and the Santa Cruz Mountains presently insulate the subregion from San Francisco and the urbanized portions of San Mateo County. The boundaries of the subregion were drawn to include the entire watershed draining into Half Moon Bay, the coastal viewshed, and the highway service system. The land use is presently in transition from row crops and grazing to floriculture and suburban residential development.

Step 1: Existing Development Potential

A 1972 special census estimated the population in the subregion to be approximately 11,700. By overlaying maps showing developable lots, existing zoning, and land ownership patterns, it was determined that approximately 15,600 residential units could potentially be constructed to house an additional 48,000 residents. The resulting 60,000 population in the subregion would be a five-fold increase over the existing population.

Step 2: Mapping of Resource and Hazards Policies

The Coastal Plan's resource protection policies for preservation of prime, coastal dependent, and coastal related crop lands, etc. were mapped. If these are protected, the number of residential units would be reduced by 9,500 and the ultimate population lowered by 23,000 persons.

Step 3: Estimation of Development Potential Resulting from Possible Sewer, Water, and Transportation Systems Expansions

Roads and Transit. The two existing inter-regional highways (State Routes 1 and 92) can accommodate a 4,500-person increase in the residential population before reaching capacity at the poorest service level (30 mph) during peak use periods.

Proposals have been made to reroute the two inter-regional highways and expand the roadway from two to four lanes. The road cuts, fills, and new alignment may significantly conflict with the Coastal Plan policies that are designed to protect the scenic quality of coastal landscapes. If Route 1 is rerouted and expanded to four lanes, the residential population could increase to approximately 36,000 before reaching capacity. A residential population of 57,000 could be accommodated if Routes 1 and 92 are both rerouted and widened to four lanes.

However, the Half Moon Bay area currently is being transformed into a regional recreation center (including proposals to develop a 1,000 boat marina, expand county and State recreation areas by 6,241 acres, and intensify recreational use in existing coastal parks). Proponents for expanding the capacities of Routes 1 and 92 have argued that the primary reason is to serve recreational traffic. But projected recreational traffic to the proposed facilities would congest even the four-lane versions of both highways on peak weekends; transit alternatives to highway expansion may be needed to resolve the recreational road congestion problem (e.g., possible use of San Mateo transit district busses on weekends). This recreational traffic volume is an alternate to the additional 57,000 residents otherwise projected. Both cannot be accommodated without additional roads.

Water Supply and Sewage Treatment Systems. It was estimated that both the water supply and wastewater systems in the subregion can accommodate a 6,000-person increase in population before reaching design capacity for a town population of about 18,500. Expansion of the water supply system beyond the design capacity depends on both the extent to which reclaimed wastewater can be used to supply agriculture demands and the development of new domestic water supplies. Unless agricultural use of domestic water is reduced through substitution of reclaimed waste water, County Coastside Water District must construct a pipeline across the Santa Cruz range to obtain the Crystal Springs Reservoir water for which it has a ten-million-gallon-per day contract. In addition, a substantial increase in residential, recreational, and agricultural water demand would have to be promoted to finance the large capital investment required to construct the pipeline. Assessment of properties within the water district to pay for the pipeline may force conversion of agricultural lands to urban uses, a major conflict with Coastal Plan policies. Other water supply alternatives might require stream impoundments or groundwater withdrawal with potential impacts on sediment transport, biotic communities, or anadromous species that will conflict with Coastal Plan policies (e.g., Coastside Water District must limit its proposed groundwater withdrawal program to prevent salt-water intrusion of Pillar Point marsh).

Expansion of sewage treatment capacity in excess of current Department of Finance population projections of 13,500 for the Half Moon Bay area must be funded totally by the local utility. If the sewage plan expansion is considerably greater than the capacity funded by State and Federal grants, assessment of properties within the sewage district to pay for the excess capacity may force conversion of agricultural lands to urban uses.

Step 4: Alternative Development Levels and Patterns Consistent with Coastal Plan Density and Access Policies

The previous step suggests two population levels as a basis for posing alternative development patterns that would be in accord with Coastal Plan policies

on intensity of use and accessibility to coastal resources: (1) 16,500 (the decision point on expanding the existing highways) to 18,500 (the decision point on expanding the existing wastewater and water supply capacity); and (2) 36,000 to 39,000, with Route 1 at four lanes and the importation of water.

Alternatives at the 16,500 to 18,500 population level. One alternative at this population level is the development of vacant lots within the small communities of Montara, Moss Beach, El Granada, and Half Moon Bay. Only those properties that do not conflict with the Commission's resource protection policies would be developed, with priority for lots presently served by existing water, sewer, and road facilities. The bulk of the remaining land is in a single ownership, and this may make it possible for the allowable level of development to be concentrated in areas of the holdings where the resources have already been altered and thus to preserve the remaining lands for open space and agricultural uses.

A second alternative would be to allocate a significant portion of road, water, and sewer services to recreational visitors. For instance, if the remaining peak-hour capacity of Highway 1 were allocated for recreational access instead of residential development, the existing highway could serve approximately 18,000 recreational travelers during a three-hour peak travel period. Additional residential development would have to be limited until Highway 1 is improved or inter-regional transit is provided. Similarly, additional residential development will likely compete with recreational development for water supply and sewage services available from the existing systems. Reserving water supply and wastewater treatment for recreational uses would limit residential development to approximately 14,000 persons.

Alternatives at the 36,000 to 39,000 population level. To reach this population level, higher density development would probably have to occur within the sub-region. As lands not covered by resource protection policies become developed, the undeveloped coastal resource areas—including agricultural lands and view corridors—come under more intense pressure for development. Agricultural, recreational, and residential uses continue to compete for water supplies. Competition will continue between recreational and residential development for wastewater treatment services and highway capacity.

It should be noted that the 36,000 to 39,000 population level coincides with the maximum population growth that could occur under current zoning without having direct adverse effects on coastal resource areas (see Step 2 analysis). To go above this population figure without encroaching on resource areas would require an increase in zoning beyond present densities to allow intensification of development in non-resource areas. Transfer of development rights from resource areas to high intensity areas might also be necessary if the lands involved are not all in the same ownership.

HUNTINGTON BEACH CASE STUDY

The Huntington Beach study area is in northwest Orange County and covers the 5-mile-wide coastal zone between the cities of Seal Beach (Anaheim Bay) and Newport Beach (the Santa Ana River). This area is actually part of a larger sub-region that includes Alamitos Bay in Long Beach and much of Newport Beach. The larger subregion is characterized by similar development pressures, public

service commitments, and transportation and coastal access problems. However, due to lack of time, this illustration of the subregional plan process is limited to the Bolsa Chica Lowlands and Townlot area of Huntington Beach.

Step 1: Existing Development Potential

Huntington Beach is one of the fastest growing communities in southern California. During the past 10 years the population has increased from 15,000 to 150,000, and the City's general plan projects up to 250,000 persons by the year 2000. Roughly 80 per cent of future growth in the area is projected to occur along the primary coastal access roads and immediate shoreline area, with the majority of this growth expected in the following areas: the unincorporated Bolsa Chica Lowlands (26,200 persons), Standard Oil properties (22,570), Huntington Harbour (14,200), the Townlots (9,500), and the Highway 39 and Warner Ave. corridors (88,000). Huntington Beach may be an appropriate area to encourage development because of its proximity to major employment centers, but the key issue is how to do so without adversely affecting coastal resources and access.

Step 2: Mapping Resource and Hazard Policies

Resource Areas That Should Not Be Developed. The Bolsa Chica Lowlands are 1,400 to 1,600 acres of wetlands and restorable wetlands, portions of which are in agricultural use. This area is one of four "Planning Reserve Areas" designated by the county as needing critical planning decisions in the next few years. It is surrounded by residential development. Two major projects are proposed for the lowlands: (1) the State Department of Fish and Game, cooperating with other agencies, plans to restore portions of the wetlands (about 380 acres) and to develop about 150 acres as a commercial marina and small craft harbor; and (2) Signal Properties proposes to develop a residential community for 26,200 people in the remainder of the former wetlands. Proposed land uses must comply with Marine Policy 14, which states that no development of former wetlands shall be allowed unless the area cannot be restored. Only the restoration program is clearly in compliance with the adopted policy; the residential and marina proposals present substantial conflicts with Plan policy and require further study and project modification or relocation.

Hazard Areas in Which Development Should Be Modified. Huntington Beach is traversed by the active Newport-Inglewood fault system; the greatest potential for surface rupture occurs from Bolsa Chica Lagoon northwest through Huntington Harbour. According to Policy 175, structures for human occupancy would only be allowed if site treatment and construction techniques can overcome the hazard. This policy would affect the City's existing commitment to the proposed planned residential community in the Bolsa Chica Lowlands for 26,200 persons. Similarly, Coastal Land Policy 25, which directs that development shall not adversely affect the recharge capacity of floodplain areas, would also discourage the paving and covering with residences of the substantial floodplain area. In general, non-residential uses (recreation, agriculture, etc.) are encouraged in natural hazard areas.

Recreation and Education Priority Uses. Related Marine and Recreation policies would encourage the proposed restoration program and the creation of a recreation center primarily addressed to environmental education and science but linked by transit and trails to surrounding parks, beaches, and other nearby visitor areas. The Plan policies relegate residential development in the lowlands to a low priority and substantially reduce the number of units that could be constructed in the unincorporated Bolsa Chica area.

Step 3: Estimation of Development Potential Resulting From Possible Sewer, Water and Transportation Systems Expansions

Coastal Access. The existing development commitment (Step 1) assumes the need for increasing beach access, commercial resort and overnight uses, and restoration and management of the Bolsa Chica Lowlands. However, the proposal to construct the 1,800-boat harbor and marina in Bolsa Chica might require a bridge on Highway 1 to provide a new boat entrance for the marina. More critically, it would generate substantial traffic (500,000 visitors annually) that would compete with other recreation activities (day-use beach activities) for the limited remaining road capacity. Based on existing and projected congestion along Highway 1 and key coastal access roads, improved access for the boating public may be achieved at the expense of area beach and park users. Therefore, potential marina sites (such as Pier J in Long Beach) that might not create these conflicts should be considered as alternatives.

Transportation: Key Decision Points and Alternatives. The primary public service commitments affecting the level of development in Huntington Beach involve transportation improvements. The key coastal access routes for inland residents, Warner Ave., Route 39, and Golden West, must accommodate most of the increasing visitor traffic; according to City projections, these corridors also will accommodate about half of the City's projected residential growth. Route 1 and Route 39 are already at or near capacity, and Warner will exceed design capacity by the year 2000. Only Golden West (a six-lane right-of-way) appears capable of absorbing the expected traffic increase based on current design. Therefore, basic decisions concerning road and transit service levels must be made in the near future. Buildout to the projected population should involve the consideration of specific transit proposals, including: improved public transit service along major coastal access routes (Route 39, Golden West, and Warner), development of the Orange County rail corridor for passenger service, development of visitor destination points combined with park-and-ride shuttle service to public beaches and the downtown area, and resolution of alternative proposals for the Highway 1 Transportation Corridor behind Bolsa Chica.

Step 4: Alternative Development Levels and Patterns Consistent with Coastal Plan Density and Access Policies

Low-density residential development in the Bolsa Chica lowlands would conflict with Development Policy 164 (concentrating development) as long as additional development could be accommodated in the already developed, serviced portion of the City. Development pressures on the fragile Bolsa Chica resource could be relieved by channeling higher intensity development toward areas with available service capacities and public transit potential.

Development Alternatives. Based on the foregoing policies the following development alternatives might be consistent with the Plan: (1) intensifying development along major coastal access routes (Route 39, Warner, and Golden West), (2) restricting residential development in the Bolsa Chica Lowlands and increasing densities in the Townlots and along the major coastal access corridors, (3) intensifying resort commercial development in the downtown areas, (4) developing recreation and visitor serving facilities in Huntington Harbour, and (5) expanding the current Central Park concept to include linkages via greenbelt and trails with the Bolsa Chica Lowlands and Bolsa Chica State Beach, including provision of upland support and buffer park facilities (parking, passive areas, etc.).

Comparison: Bolsa Chica Development Vs. Shift in Density to the Townlots.

Development of a sizable portion of the undeveloped Bolsa Chica lowlands west of Golden West for commercial and residential purposes would result in (1) the loss of scenic viewshed, recreation land, and open space; (2) commitment of a sizable portion of one of the last remaining wetland habitats in the South Coast to intensive recreation/commercial use; (3) dredging a channel to the marina through the State Beach and Highway; and (4) excessive public costs (repairs to roads, flood control projects) associated with residential development in an area with severe geologic and flood plain hazards. The commitment to develop the Bolsa Chica Lowlands also would continue a pattern of consuming vast coastal land areas for low density sprawl (e.g., Sunset Height, and Townlot areas).

Shifting the proposed Bolsa Chica residential development to the Townlots or other parts of the City with good public services would have the following positive impacts: (1) a density shift with development at higher densities in the Townlots area would facilitate the provision and maintenance of public transit along major access routes and in the Townlots area; (2) dependence on the automobile would be diminished, thus contributing to improved air quality and coastal access; (3) efficiency of existing public services might be improved and the high costs associated with development in the lowlands area might be avoided; and (4) new incentives could be offered to landowners (in the form of increased densities) that would encourage the consolidation of lots and blocks within the Townlots area to enable the provision of a mix of housing types and costs, with an increase in public open space and parkland and a more coordinated approach to site planning and design.

OTHER EXAMPLES OF SUBREGIONAL PLANNING ISSUES

Because of the tremendous diversity of the California coast, two case studies cannot convey a complete understanding of the range of issues that must be addressed in dealing with coastal areas threatened by conflicting resource demands. The following section describes other major issues that can best be resolved through subregional planning. The areas of statewide significance described below present many of the major types of conservation and development concerns on the coast. The examples: (1) the cumulative impact of development of many small lots in rural areas (the Mendocino coast); (2) a major agricultural area threatened by development pressure (the Oxnard Plain in Ventura County); (3) a low density residential area important as a regional recreation center but now under pressure for residential intensification (Malibu, in Los Angeles County); (4) one of the last large open coastal areas in southern California currently being planned for development and park use (the Irvine coastal property in Orange County); (5) a high-density residential and recreational area undergoing further intensification that is harming coastal access and threatening coastal neighborhoods (Marina del Rey/Venice in Los Angeles); (6) an older urban area just starting to feel major intensification pressures resulting in displacement of residents (San Pedro in Los Angeles); and (7) important lagoons situated in a rapidly developing area (Agua Hedionda and Batiquitos Lagoons). The summaries include at least one subregion in each coastal Region except North Central Coast to give residents a sense of how subregional plans might be prepared for their areas; North Central applied some of the proposed process in preparing its Plan Maps and Regional Summary in Part IV.

Fort Bragg to the Gualala River (Mendocino County)

Among the many coastal resources of this region are its redwoods, fisheries, its rural, scenic character, and its small coastal towns. To maintain the character of the area, the economic viability of non-prime-soil agriculture must be improved and further land divisions must be controlled. Logging is very important to the local economy but must be better controlled to limit soil erosion, disruption of wildlife habitat, and adverse effects on the fisheries resource that is also an important part of the local economy. Timber taxation practices can have a significant impact on the manner in which timber lands are managed. Tourism, one of the mainstays of the area's economy, should be encouraged to expand, but tourist facilities must be well designed and located to avoid degrading scenic resources or overloading local services such as water supplies. One of the main attractions of the tourist industry, scenic Highway 1, could be overwhelmed by congestion if tourism expands and competes during peak summer months with residential traffic.

In Mendocino County, 6,000 undeveloped but subdivided residential lots within 1,000 yards of the coast have been carved out of grazing lands. Competition for Highway 1 capacity could eventually force construction of a lateral access road from the coast to Highway 101 at a high cost to the public. From Caspar to Manchester, the rural character of the landscape, dotted by occasional small towns such as Mendocino, Little River, and Elk, may gradually be transformed by the buildout of thousands of single-family, primarily second-home, lots along Highway 1. Subdivisions such as Irish Beach and Whiskey Shoals may create separate suburban second-home communities with no ties to existing communities and commercial services. The soils also present significant limitations on septic tanks in many areas, possibly leading to failures and water quality problems as development of the existing lots take place. Lot consolidations, public purchase, and other controls on the buildout should be considered. In the southernmost part of the subregion, PG&E is continuing to investigate sites for a nuclear or fossil fuel power plant, although USGS reacted unfavorably to the seismic hazard posed by a previous application.

Oxnard Plain (Ventura County)

The Oxnard Plain contains some of the most fertile agricultural land in California, and also includes Mugu Lagoon, Channel Islands Harbor and marina, McGrath State Beach, and the Santa Clara River system. The extensive local commitment to further urbanization will threaten many of these valuable resources. The possibility exists for conversion of thousands of acres of prime agricultural soils to urban uses; inadequate public access to harbor and marina areas; intensification of shoreline coastal neighborhoods; long-term preemption of coastal access to State Beach facilities; home construction on sandy beach areas; water quality deterioration produced by inadequate sewage treatment; saltwater intrusion; overdrafting of groundwater aquifers; and uplands development in the watershed that creates increased storm runoff and lower water quality. Proposed transportation improvements that will affect development patterns in the Oxnard Plain include the widening of Route 101, the possible construction of Highway 1 Bypass around the City of Oxnard, and the extension and expansion of Route 126 (Santa Paula Freeway) to connect with Interstate 5.

Alternative development patterns consistent with Coastal Plan policies could include the concentration of future growth in the already-urbanized area of the Plain (e.g., Oxnard, Port Hueneme); the expansion of the Port Hueneme complex; and the consolidation of inland transient commercial services (motel accommo-

dations, restaurants, retail food outlets, etc.) in urbanized areas where public transit can provide transportation to shoreline recreation resources. Complementary steps include implementing guidelines for development adjacent to agricultural lands, the balancing of public service commitments (water, sewer, and roads) with acceptable levels of future growth to ensure the protection of prime agricultural areas, the provision of public access opportunities in the rapidly expanding Channel Islands residential/marina complex, and the possible expansion of the McGrath State Beach area.

Malibu Subregion (Northern Los Angeles County)

Malibu's principal coastal resources include its smog-free air, its scenic, intermittently rocky and sandy shoreline (the Pt. Dume headlands, and Leo Carrillo,

Westward and Surfrider public beaches), the rugged, heavily-eroded Santa Monica Mountains (Charmlee Regional Park), and wildlife habitat areas (Malibu Lagoon, offshore waters north of Pt. Dume). Malibu has long been an internationally known resort-residential area for the Los Angeles Basin. The key issue is how to retain the natural and scenic coastal resources responsible for its popularity in the face of persistent development pressures that could result in the suburbanization of the area. In the permit zone alone, more than 2,300 dwelling units have been approved or are pending, and the South Winter Mesa area (77 acres) is zoned for an additional 1,694 units. Other major proposals include a community shopping center and a 140-room hotel and condominium tennis club in the Civic Center area. Development approved between February 1973 and August 1974 represented a 4-fold increase over the Southern California Association of Governments' population allocations for the area. Based on the 2,300 dwellings approved and pending, the 1990 Master Plan population of 2,300 persons will be reached before 1980. Adverse development impacts on coastal resources are evident: much of the ocean view along Route 1 is already blocked and the road is congested (according to the California Department of Transportation, "it cannot be expected that Route 1 can adequately handle the anticipated future traffic..."); public access to coastal resources can deteriorate; and failing septic tanks can pollute streams and offshore waters (Malibu is not served by a sanitary sewer system).

Alternatives to current development trends that should be considered include: (1) master planning the Civic Center area (including Malibu Lagoon); (2) the development of a limited sewerage system sufficient only to serve the Civic Center area and existing problem areas along the coastal terrace east to the Los Angeles City line; (3) the potential for public transit along Route 1, including increased tram/shuttle service to beaches and parks, the Civic Center, and primary destinations (e.g., Pepperdine University); and (4) the clustering of residential and commercial development east of Pt. Dume. The County and State could plan jointly to acquire and develop additional shoreline frontage, local parkland, and upland recreational support areas linked with beaches and the shoreline via trails and trams. Finally, the County and State should jointly explore how further development in Malibu could be phased to relate to improved transit and parkland acquisition and development.

Marina del Rey to Santa Monica Redevelopment Area (Los Angeles).

Major coastal resources in this sub-region include the Santa Monica and Venice beaches, the present and potential public use areas in the Marina and on the Marina peninsula, and the variety of housing for many income levels in the

Ocean Park area of Santa Monica and in Venice. Ten major projects are under way (including three hotels) and the County has received inquiries about converting existing low-rise buildings to high-rise. Commercial office space totaling 1.5 million square feet is either authorized or under construction. Full development of the Marina del Rey area will generate traffic equivalent to a population of 30-40,000 persons. Heavy development pressure has been felt on the Marina peninsula, in other areas of Venice (especially outside the 1,000-yard coastal permit area), and in Ocean Park. A recent study cites the possibility of a "virtual ring of high-rise buildings" around the Marina.

Transportation system limitations combined with a lack of open space in residential developments in the Venice and Marina areas results in competition between residents and coastal recreation visitors for road access and public recreation areas. A County study concludes that expanded parking serving the under-used Venice Beach area adjoining the peninsula would increase demand for more beach facilities. A shortage of boat service and water-related stores exists in the Marina area due to the virtual absence of dry storage areas; commercial pressures have forced most boat-oriented businesses east of Lincoln and north of Washington St. With only 33 of 401 acres of land used for public recreation and with limited bicycle and pedestrian access to the waterfront, there is a lack of commercial-recreational uses for the general public (e.g., Fisherman's Village) in the Santa Monica beach area, in the Marina peninsula, and in the western portion of the Marina. The Los Angeles traffic department states that development should be limited to transportation capacity or road capacity should be increased; it is possible that current development trends will force the construction of the Marina by-pass through a portion of Venice.

Coastal Plan alternatives should focus upon restoring the concept of the Marina as a public recreational area. This means increasing access to existing recreational areas in Venice and the Marina and increasing the amount of public recreational area in Ocean Park, Venice, and the Marina. A coastal access plan should include a possible remote-parking/transit shuttle operation to serve the Marina, the Venice beach, and possibly the Santa Monica beach area. Development should not exceed recreational access capacity, particularly in Venice and the Marina. Joint planning should: (1) explore with the City of Los Angeles the possibility of using city-owned lots in Venice for low-cost housing and to absorb development that otherwise would occur on unbuilt lots in the Marina peninsula (perhaps through a transfer of development rights); (2) work with the City of Los Angeles in down-zoning the Venice area and implementing low-cost housing programs; (3) work with the County to develop "second generation" development policies for the Marina that would return significant areas to public use when existing leases expire (concentrating development in the remaining areas would promote transit use; priority sites for hotel/motel use should be related to an internal transit system); (4) explore with the City and the County the eventual transfer of residential density from the Marina peninsula to the eastern portion of the Marina. A specific plan should link existing public use areas with those that will revert to public use in the future via pedestrian and bicycle paths. Commercial recreation sites near the Venice peninsula and the Santa Monica beach should be designated. The amount and location of commercial office development in the Marina should be limited, with the bulk of new office space demand relocated to areas with better mass transit potential such as downtown Santa Monica and the Los Angeles International Airport area.

San Pedro (Los Angeles)

Major regional recreation resources (both public and commercial) in the San Pedro Community include Cabrillo Beach and Museum, Del Mar and Harbor parks, Ports of Call, and Fisherman's Village. San Pedro residents are a diverse group including many minorities.

The San Pedro General Plan and zoning are badly outdated. The area is generally not developed to the densities allowed by existing zoning, but if it were, the natural terrain and public service capacities would be overwhelmed. Proposed development could result in diminished access to coastal resources for low-income and minority groups, displacement of present residents, and a change in community character from a marine orientation to a residential and office area. Current development proposals include the Beacon Street Redevelopment Project (senior and low-income housing units and an office/hotel/tourist commercial complex), a massive residential project near 20th and Harbor Drive (2,500 units and up to 4,500 boat slips), 900 boat slips at Cabrillo Beach, and an Air Force proposal to build 220 condominiums on a portion of Fort MacArthur. The potential transfer of Fort MacArthur to the City or County would add further public recreation facilities.

Alternatives or modifications of current development pressures that should be explored focus first upon improving San Pedro's regional recreational resources and protecting widespread accessibility to them. Conflicts about the future status of Fort MacArthur will have to be resolved. A mix of inexpensive and low-skill recreational activities should be provided, along with boating and other expensive recreation, to safeguard San Pedro's current status as a major recreational resource for minority and low-income groups.

The City, County, and State must cooperate in phasing future building to balance commercial and residential development with better support for public transit. Alternatives here include shuttle services from parking centers at Beacon Street or Harbor Park; development of a linear park with pedestrian and bike trails linking downtown, Ports of Call, MacArthur, Cabrillo Beach and Museum, and Royal Palms Park, and connecting them with a greatly expanded regional trail system; and development of freeway transit services from other parts of the Los Angeles basin.

A major resource to be conserved through careful revision of the General Plan and joint public action is the continued availability of low- and moderate-income housing as San Pedro shifts from a modest residential community toward a job center with intensive residential complexes. Reduction of wholesale conversion pressures through protective down-zoning might augment positive programs for reserving a portion of new dwellings for low- and moderate-income persons. Careful application of design standards could fit a certain amount of new building into established neighborhoods and help retain the existing marine/harbor orientation of the community. Concentration of most of the new building downtown could help increase the practicality of transit service, which will be an important factor in judging the appropriate extent of commercial and residential development. This could also minimize the costs of expensive upgrading of sewers and streets.

Suitability of sites in San Pedro for major marina, LNG, and port development proposals must be evaluated in a regional context because they involve basic use conflicts such as safety and long-term major access questions inseparable from regional growth and intensification patterns.

Upper Newport Bay-Irvine (Orange County)

This area, focusing on the San Joaquin Hills and 3.5 miles of almost undeveloped shoreline, includes the largest block of open coast in Orange County. The San Joaquin Hills provide significant open space, habitat, and recreation values, while the bluffs and shoreline include a marine life refuge, protected tide pools, and superb offshore waters being considered for special protection. Upper Newport Bay is a valued estuarine habitat that furnishes substantial recreational use. There are extensive prime agricultural lands at the I-5/I-405 junction and in the vicinity of the San Joaquin Hills.

Most of this subregion, except for the City of Irvine and Upper Newport Bay, is owned by the Irvine Company. It has recently proposed a coastal community of 30,000-50,000 persons, with a major shoreline resort at Crystal Cove. The Irvine plans, in cooperation with the County, anticipate the completion of a six-lane scenic corridor as an extension of State Highway 73 through the hills to connect with I-5 behind San Juan Capistrano. Four roads through the hills would connect inland areas with Route 1. Other major plans affecting coastal resources include continued substantial growth of the City of Irvine; some further expansion of commercial and industrial space at the Orange County Airport; a major new industrial-commercial center near El Toro/Mission Viejo; and a State-County estuarine restoration program for the Upper Bay. Area growth estimates vary, but generally conclude that the south coastal area will double or triple in population during the decade from 1970 to 1980. This will constitute a substantial share of anticipated County growth as affluent residents continue a major shift away from older portions of the Los Angeles metropolitan area.

These very substantial development proposals could severely harm the area's resources. Substantial residential development could destroy valuable natural areas and diminish public access to recreation and commercial facilities along the coast. Remote residential development would create a substantial increase in vehicle miles travelled, placing further stress on already poor air quality. Construction of the scenic corridor and lateral highways through the San Joaquin Hills connecting it with Pacific Coast Highway would greatly increase development pressure. Development around the bay and in agricultural lands and watershed, without very careful controls, could exacerbate current siltation and pollution, impeding publicly-financed restoration efforts. Conversion of agricultural land would eliminate especially productive truck farming areas.

Acceptable development proposals for the Upper Newport Bay-Irvine area should focus clearly on two basic concepts. A primary Coastal Plan goal is retaining the immediate shoreline and its access routes as a major public recreational resource. Given the accessibility of this area to 7 million southern Californians, priority should be given to satisfying public resort and parkland needs and visitor highway access. The amount of private residential development should be determined only after these public access concerns have been satisfied. Much of the visitor traffic will have to be served by transit or shuttle systems rather than autos. Public and private campgrounds and resorts should feature a range of prices, and extensive upland support areas should be reserved for future needs.

Natural and agricultural resources within the planning area should be preserved, even if this means substantial changes in the present projections of regional growth patterns. One major resource is the Upper Bay. Adequate protection will probably require augmentation of the recent State purchase by a protective park for quiet recreation around the bluffs, severe development restrictions within the flood plain, and improved watershed practices such as stricter grading controls and collection and treatment of urban runoff before it enters the bay. Protection

of agricultural lands will require major changes in planned growth. Protection of air quality may force rethinking of the planned scenic corridor and, in addition to heavy reliance upon transit improvements, may suggest alternative development patterns to current proposals for east-west roads through to Pacific Coast Highway. Substantial recycling of older urban areas in the mid-county, with stronger transit linkages to existing job centers, should be considered as a real alternative to continued sprawl.

Agua Hedionda Lagoon to Batiquitos Lagoon (Northern San Diego County)

The main coastal resources in the portion of North County extending from north and east of Agua Hedionda Lagoon to the south shore of Batiquitos Lagoon (shown as portions of Carlsbad and San Dieguito subregions on the Plan maps in Part IV) include major coastal agricultural areas, especially flowers and truck crops, two major lagoons, and important present and potential public and commercial recreation areas. Planned public services and current development trends allow for up to 4,500 new residents per year with a population of 46,000 to 60,000 persons by 1985, compared to a current population of 17,500. A 350-acre industrial park proposed south of Palomar airport, a proposed refinery southeast of Agua Hedionda, the La Costa development east of Batiquitos, an urban enclave near Poinsettia Lane and a proposed 1,100 acre (12,000 residents) project north of Batiquitos could combine to create a second urban nucleus in Carlsbad separate and distinct from the existing urban center. Projected development patterns will result in the conversion of 33 per cent of Carlsbad agricultural lands by 1995, with most of the remainder slated for conversion with the completion of proposed planned communities. Development impact on the lagoons may include siltation from construction on steep sandstone slopes, heavy urban storm runoff into the lagoons, interference with such natural flood plain and drainage areas as San Marco Creek serving the lagoons, and destruction of diverse wildlife areas formed by a combination of eucalyptus and coastal sage with grasslands and fallow fields around Batiquitos. Loss of potential recreational areas would be particularly severe because the North County area has the greatest deficiency of upland park support areas in San Diego County and State beach campsites can serve only 10 per cent of the projected camping demand by 1980. San Diego County has, however, significantly reduced its acquisition priority for Batiquitos due to high park development costs.

Alternatives to current development trends that should be explored include encouraging concentration of development in the present urban center. In non-resource areas, determination should be made of the most appropriate uses near agricultural lands (e.g., industrial vs. residential uses). Agricultural preservation programs to be explored include agricultural zoning, use of the Williamson Act, possibly with a special category of subventions for urban areas, and the sale-leaseback program proposed by the San Diego Comprehensive Planning Organization. Public services should not be extended to resource protection areas. Master planning of both lagoons should determine balances between active recreation and passive recreation, agricultural use vs. wildlife uses, and park vs. residential uses. The State and the County should plan jointly a possible acquisition of park buffer area around Batiquitos, with Amtrak and tram service to beach areas. Limited dredging in the lagoon should be considered to restore wildlife areas.



Part III: Carrying Out the Coastal Plan

Alternatives for Coastal Regulation and Management

No plan dealing with controversial matters is apt to be of lasting value unless it can be enforced. The Coastal Act therefore requires that the Coastal Plan contain "recommendations for the governmental policies and powers required to implement the [plan] including the organization and authority of the governmental agency or agencies which should assume permanent responsibility for its implementation."

There are many ways, some more effective than others, by which the Coastal Plan can be carried out. This section describes these options. No recommendation is made in this Preliminary Plan, because discussions and evaluations of these options are still being conducted by the State and Regional Coastal Commissions. Public testimony on the alternatives is specifically sought at the plan hearings scheduled in the spring.

This section of Part III discusses three questions:

- (1) What form or forms of governmental structure can best carry out the Coastal Plan?
- (2) What governmental powers will be needed to carry out the Coastal Plan?
- (3) And what will it cost to carry out the Coastal Plan?

GOVERNMENTAL STRUCTURE TO CARRY OUT THE COASTAL PLAN

CRITERIA

Possible forms of governmental organization to carry out the Coastal Plan should be evaluated using the following criteria:

Encourage Public Participation. Complex governmental organizations and procedures can make it difficult for all but the well-organized and well-financed to present their views effectively. Constant contact between a governmental agency and the interests it regulates can, over time, lead to decisions more and more favorable to the interests being regulated, and less and less favorable to the public. Sometimes, decisions of such an agency seek only to balance the views of the proponents of a policy and those opponents who are able to advance their views. The resulting decision may indeed achieve a balance between such views, but it may also leave out a considerable part of the overall public interest.

The public should be able to play a major role in the decisions that will cumulatively determine whether or not the Coastal Plan is being carried out. The lone biologist who knows the effect of a proposed action on a marsh area, the homeowner concerned over a proposed coastal development, and the owner of

a coastal farm may all have information and views helpful to any governmental agency required to preserve, enhance, and restore the resources of the coastal zone—and such persons should be able to make their views known easily and fully.

Provide Visibility, Accessibility, and Accountability. The agency designated to carry out the Coastal Plan should be visible: its actions should be open and widely publicized. The agency should be accessible: it should have understandable administrative procedures; should provide staff assistance for all parties involved in matters before it, applicants and opponents alike; should have meetings and offices in convenient places; and should provide for easy access to appellate review and the courts. Finally, the coastal agency should be accountable: citizens should have a clear way to seek to change both the decisions and the decision-makers if they do not adequately carry out the Plan.

Protect Both Statewide and Local Interests. The Coastal Plan has identified coastal resources important to all the people of California, now and in the future—there is a "statewide" interest in these resources. They include scenic coastal highways, wetlands that are essential to the ocean fishery, prime agricultural lands, coastal neighborhoods, beaches and parks. Some coastal streams have vital runs and breeding grounds for fish critical to California's commercial and recreational fishing industry. Some coastal lands provide unique recreational opportunities for persons who live elsewhere in the State, outside the coastal zone. Other coastal sites may be needed for energy generating facilities to meet California and national energy demands.

The agency designated to carry out the Coastal Plan must be able to fully protect this statewide interest in the coastal zone. At the same time, it must be able to give full weight to the interests of the people who live in the area that will be most affected by coastal decisions, and to the views of the local governments having jurisdiction over such areas. In some cases, the local and statewide interests may be in conflict. For example, people already living in coastal areas may seek privacy, with no increase in access for outsiders to reach the beaches near them; but the broader interest may lie in providing more access to the oceanfront. Or local government decisions may have unintended impact on coastal resources beyond the locality's immediate boundary. A balancing of interests will clearly be needed, and the agency designated to carry out the Coastal Plan should be able to properly consider them.

Operate Efficiently and Economically. The coastal agency should be designed to operate efficiently and economically. Duplication of activities among governmental agencies should be eliminated, and decisions on proposed projects should be made as rapidly as possible. Administrative costs should be kept as low as possible.

Deal Fairly with Diversity. The coastal zone of California is 1,072 miles long and contains diverse terrain and diverse communities. But coastal resources deserve protection, wherever they exist along the coast. Coastal Plan policies should be applied evenly and uniformly, and differences in their application should be based solely on differences in coastal areas.

Maintain Flexibility and Adaptability to Change. The Coastal Plan will need amendment from time to time. In an era of rapid change, the agency designated to carry out the Coastal Plan should be able to amend both statewide

and regional policies, upon showing that such changes are dictated by new circumstances. But such changes should not be made capriciously.

No governmental agency can achieve all these standards to the same degree at the same time. For example, an agency that provides fully for public participation in decisions and for thorough hearings will have higher costs and longer processing times than an agency that does not. It is therefore necessary in evaluating governmental options to decide which of these criteria are paramount, and how to achieve a balance among them.

ALTERNATIVE GOVERNMENTAL ORGANIZATION TO CARRY OUT THE REGULATORY AND PLANNING PORTIONS OF THE COASTAL PLAN

There are several ways new and existing governmental agencies could be designated to carry out the regulatory and future planning functions called for in the Coastal Plan. Each has its advantages and disadvantages, and there is no one "right" answer. The principal alternatives are the following:

1. Multi-Purpose State Agency. A new State agency could be created not only to carry out the Coastal Plan but also to have responsibilities in several related areas—perhaps statewide land use planning and regulation, transportation, energy supply and conservation, control of air and water quality. Under this alternative, carrying out the Coastal Plan would presumably be the responsibility of a division or department within a very large and powerful agency. In theory, such an agency would provide for effective coordination among the many areas of interest that affect the coast, such as highway construction, agricultural land policies, and water quality control. In practice, it is likely that such coordination would depend largely on the priorities established in the enabling legislation and by the governing body. Whatever the statewide benefits of such an agency, it is clear that coastal protection would be unlikely to receive the high priority given it by the people of California through passage of the Coastal Initiative (Proposition 20) in 1972.

One option within this general alternative would be a statewide agency of the type outlined above, but with regional components—multi-purpose regional agencies—in at least the urban areas of the State.

2. Single Statewide Agency. If economy were the main criterion, the best coastal agency would be a single statewide agency. There would be no regional components. The State agency would do all the coastal planning and regulation called for by the Coastal Plan; local governments would merely continue their present functions and authority. Because the workload for such a State coastal agency would be great, a commission of full-time members would probably be required. Without regional components, it might be difficult for such an agency to fully recognize and deal with the diversity of coastal areas. It would also exclude local government representation and greatly reduce public membership. Finally, accessibility of the public might be limited if there were only one headquarters in the State.

3. State Coastal Agency with Regional Components. Under this alternative, a State coastal agency would be established, but it would have regional components to provide for greater public visibility and accessibility. Perhaps the structure established under the Coastal Initiative (Proposition 20) could be continued,

with a State and regional commissions; perhaps there could be a State commission, with regional as well as statewide representatives, and with regional offices or divisions but not commissions.

4. Carrying Out the Plan Entirely by Local Governments. Under this alternative, there would be no State coastal agency. Existing State agencies (such as the Departments of Transportation, Fish and Game, and Parks and Recreation) would be directed to carry out Plan policies within their areas of responsibility, and the bulk of the responsibility would rest with local governments. One way of achieving this would be legislation requiring that each local government have within its General Plan a coastal element consistent with the Coastal Plan. Another would be to require a comprehensive planning and implementation program to carry out Coastal Plan policies. Such a program might include capital improvement budgets and specific implementation techniques and ordinances, in addition to a land use plan.

This alternative would provide for public accessibility to the agency and should provide for efficient and economical operation. The principal drawback, however, is that this alternative could not provide for a comprehensive view of the coastal zone. In the absence of a State coastal agency to oversee implementation of the Coastal Plan it seems likely that varying interpretations and applications of coastal policies will occur. The Plan cannot always be specific enough to prevent conflicts. Providing for Plan revision would also require some form of continuing State involvement in coastal planning.

Also, could this alternative adequately protect coastal resources of statewide importance, weigh and balance local vs. statewide issues, and deal effectively with the concerns of single-purpose agencies such as those in the field of transportation. Many of the adopted policies in the Coastal Plan have statewide coastal implications and may be beyond the scope of local governments to administer alone. Examples include: (a) coastal siting considerations for major energy facilities (power plants, refineries, offshore drilling platforms, LNG facilities, and tanker terminals) that are needed to meet California and national energy demands; (b) protection, enhancement, and restoration of resources of statewide importance, such as fishery resources, migratory bird habitats, and remaining wetlands through comprehensive statewide management programs; (c) the preservation of scenic vistas, significant open spaces, coastal dependent agricultural lands, and major coastal recreation areas that transcend local jurisdictional boundaries; (d) ensuring maximum public access to the shoreline; and (e) the development of major inter-regional ports and coastal transportation facilities. Local implementation of the Coastal Plan could not adequately protect these and similar statewide interests without some kind of effective coordinating agency.

5. Plan Implementation Primarily by Local Governments but with a State Coastal Agency. This alternative would provide that most of the Plan policies would be carried out by local governments, but that a State coastal agency would be created (a) to continue planning efforts in order to keep the Coastal Plan up to date, (b) to hear appeals from decisions of local governments challenged as being in conflict with the Coastal Plan, and (c) to safeguard the statewide interest in coastal resource management.

This alternative has several possible variations within it: there could be a single State coastal agency, or a State agency with regional components. Further, there could be regional components in existence for a short time,

perhaps three years, to review local plans for conformity with the Coastal Plan. This alternative would provide for maximum plan implementation by local governments, but for a continued State planning and monitoring role.

ORGANIZING A COASTAL AGENCY

Under several of the alternatives further questions arise as to the boundaries of a regional coastal agency, the composition of its governing body, means of amending the Plan, etc. These are discussed below.

Regional Boundaries. If regional coastal jurisdictions were formed (or continued), how should the coastal regions be established? (The discussion here is a determination of the counties or other areas to be in a region; the inland boundary of coastal jurisdiction will also be an important issue to be discussed during hearings this spring.

There is no ideal division of the California coast into logical regions. Certainly a strong case can be made for continuing the existing boundaries of the existing six regions: people are familiar with them as regions, the Coastal Plan is based on them, and there are perhaps no more problems with this grouping than with any other.

One alternative would be fewer regions: perhaps north, central, and south, with Del Norte County through Marin County as one region, San Francisco County through Santa Barbara County as another, and Ventura County through San Diego County as the southern region. Because of the distances and wide diversities in these areas, it is hard to regard them as regions in more than name, however. Other problems would lie in public accessibility to widely scattered offices and very heavy workloads in such large regions.

Another possibility would be conforming the regional boundaries to those of existing Councils of Government (COGs). This is favored by those who seek to minimize the number of governmental boundaries in metropolitan areas, to minimize confusion to the citizenry, and to increase the likelihood of future regional government. One way of organizing boundaries under this alternative would result in the following regions: (1) Del Norte, Humboldt, and Mendocino Counties; (2) Sonoma, Marin, San Francisco, and San Mateo Counties; (3) Santa Cruz, Monterey, and San Luis Obispo Counties; (4) Santa Barbara County; (5) Ventura, Los Angeles, and Orange Counties; and (6) San Diego County. This would provide for regional coastal agencies with the same boundaries as ABAG in the San Francisco Bay Area, SCAG in southern California, and CPO in San Diego, but not the same boundaries of AMBAG in the Monterey Bay area.

One argument against changing the boundaries is that it would not lead to that much more governmental coordination (which has been achieved to a large extent with the present boundaries); no set of boundaries will coincide with those of all governmental bodies affecting the coast, such as the Regional Water Quality Control Boards and air pollution control agencies.

Composition of Coastal Agency. If a State coastal agency is established, how should its members be chosen?

If a small, full-time State coastal agency were to be established, perhaps its members could be elected, either at large or in districts throughout the State. This would have the obvious advantage of the highest degree of public

accountability for coastal decision-makers, but the high costs of campaigning are a major disadvantage to this. Moreover, the tradition in California government is for election to general-purpose offices, such as the Legislature, County Boards of Supervisors, and City Councils, which deal with a variety of policy matters, and appointment to special purpose offices, such as agencies established to carry out land use plans or control pollution.

If there were to be regional commissions, perhaps these commissions, which are most accessible and come in contact with the public most often, could be directly elected. A State agency or commission could be appointed, avoiding the problem of costly statewide election campaigns and conforming to traditional State governmental systems.

If the decision-makers are appointed, there could be a full-time board (such as the State Water Resources Control Board, whose five members are all appointed by the Governor) or a continuation of the present system of part-time coastal commissioners. The argument in favor of the small full-time board is that its members have greater expertise and concentration in the areas of their responsibility. Arguments for part-time citizen commissioners are that they bring greater breadth of experience to their work, and that the necessary expertise can be obtained through staff, consultants, and advisory panels.

If a coastal agency is to be created through appointment, there are two basic choices: (1) all appointments could be made by the Governor or by a limited number of appointing powers, or (2) appointments could be from a variety of sources, as is the case under the Coastal Act (with half of the Regional Commission members now chosen by local government and half from the general public; one-third of the public representatives are appointed by the Governor, one-third by the Senate Rules Committee, and one-third by the Speaker of the Assembly). An argument in favor of a single appointing power is that, in determining the entire makeup of the agency, he can, if he wishes, ensure appointments of minorities and a cross-section of interest groups. The argument for the variety of appointing powers is that more points of view are apt to be represented on the agency, and there is less opportunity for a single (or a few) appointing powers to unduly influence agency decisions.

Appeals. Under some of the organizational alternatives above, decisions could be appealable either from a local decision to a coastal agency or from a regional to a State level within such an agency. The appeals system could be essentially the same as under the present Coastal Act, or it could be modified. One possibility is that appeals could be made more difficult, perhaps by requiring fees or bonds for filing appeals. On the other hand, the "no substantial issue" mechanism in the present Coastal Act has worked well to filter out unwarranted appeals. Another possibility is that, in addition to appeals by any aggrieved person, appeals could be initiated by one or more members of the coastal agency (perhaps an appeal could be filed by any two members). This general approach is in the law governing the State Water Resources Control Board; under that law, a majority of that five-member board may, on its own motion, initiate a review of a decision of a Regional Water Quality Control Board.

Amending the Plan. As indicated above, the Coastal Plan will need amendment from time to time.

One proposal for Plan amendment is that no change in Plan policies be allowed for 90 days after introduction of the proposed change and until there have been full public hearings on it (except in case of emergency), and no change in Plan maps for 60 days after introduction of the proposed change (again, except in case of emergency). And it may be desirable to require a two-thirds vote of the future coastal agency to amend a Plan policy, with a majority of the agency's members needed to amend a Plan map.

Another possibility is for amendment to be made only by the Legislature, because of the statewide significance of Coastal Plan policies. But legislative action is slow and must yield to many other priorities during a legislative year. Just as it would be difficult to require the Legislature to enact the whole Coastal Plan in great detail, it would be equally cumbersome to require every amendment of it to be by legislative action.

GOVERNMENTAL ORGANIZATION TO CARRY OUT COASTAL RESTORATION

Guiding and regulating private development will be the key to implementation of much of the Coastal Plan. But many actions essential to an effective program of coastal management cannot be carried out by private developers under public regulation alone. Such programs include:

- (1) Public acquisition or financial incentives for resubdivision of existing parcels.
- (2) Public purchase and leaseback of agricultural lands in some situations.
- (3) Removing structures to restore access, views, or natural areas.
- (4) Redeveloping and rehabilitating declining coastal neighborhoods.
- (5) Administering experimental programs for transfer of development rights.
- (6) Accepting dedication of land and easements and collecting and expending in-lieu fees for public access.
- (7) Acquiring and reserving lands for future uses.
- (8) Developing needed public facilities, preserving wildlife refuges, and acquiring interests in land necessary to protect them.
- (9) Restoring marshes, wildlife sanctuaries, and marine environments.
- (10) Coordinating programs of different agencies engaged in activities affecting Coastal Plan implementation.

Alternative organizational structures and assignment of responsibilities for these activities are discussed below.

1. Primary Reliance on Existing State Agencies and Local Governments.
The large number of Federal, State and local agencies in the coastal zone are capable of taking on most of the positive public actions called for in the Coastal Plan. Primary reliance on these existing agencies would be economical.

But each agency has programs undertaken to fulfill its own responsibilities in accordance with its own perspectives and priorities. There would be no effective means to ensure that each agency pursued the same priorities.

In addition, existing State agencies have authority for acquisition only for specific, limited kinds of public use. No State agency exists, for example, that engages in redevelopment and rehabilitation, land assembly and resubdivision, purchase-leasing of agricultural lands, and programs such as development rights transfer. Local redevelopment authorities do have the power to undertake redevelopment, rehabilitation, and restoration activities, but they are unlikely to undertake coastal conservation programs without State financial assistance and a change in financing methods.

2. Additional Powers for the Coastal Regulatory Agency. A second alternative is to give a coastal regulatory agency authority to acquire and manage property, engage in restoration activities, administer a development rights transfer system, accept dedications of property or in-lieu fees for public access, engage in redevelopment and rehabilitation activities, and allocate funds to other agencies for specific projects consistent with the Coastal Plan. A single coastal agency would thereby be given overall policy and financial responsibility for implementation of the Coastal Plan.

Such an agency would have extensive power to influence future coastal development and management. With adequate funds or control over their allocation, the agency would be in a key position to determine priorities for public action on the coast, to use its other powers to supplement regulation, and to ensure the most effective use of available funds to implement the Coastal Plan. It could act as an intermediary between private landowners and other public agencies, implementing its own priorities for acquisition but leaving the actual operation and management of public lands and facilities to existing agencies. There would clearly be a close tie between plan-making and implementation, as well as between land use controls and use of other tools.

But there are potential legal and political conflicts if regulation and acquisition are in the same agency. Could the agency deal as objectively with its own projects as with those of other agencies? Might it abuse its regulatory powers to further its other programs (for example, by using its regulatory power to reduce the value of a property before buying it)? Such an agency would have great power, and thus its composition would be of great importance.

3. Creation of a Coastal Restoration and Development Agency. To maintain the independent regulatory function of the agency designated to carry out the conservation aspects of the Coastal Plan and still ensure necessary public actions to implement other parts of the Coastal Plan, another alternative is to create a separate restoration agency. It could be established as an independent State agency, governed by a separate board of directors appointed by the Governor or the Legislature or both, with adequate powers and funding to carry out a comprehensive program of coastal restoration and development. It could be given the power to issue its own bonds, financed from both revenue-producing operations (such as leasing) and special earmarked sources of revenue. The agency could be modeled after similar public enterprises created in other states, such as the New York Urban Development Corporation and the New Jersey Hackensack Meadowlands Commission.

Disadvantages of this alternative include the possibility of conflict between the conservation/regulatory coastal agency and the restoration/development agency. On the one hand, conflicts might develop between the two over projects and priorities: the restoration/development agency might overly favor development since it probably would be partially dependent on revenues from its operations. On the other hand, the two agencies might become so close that the regulatory agency would lack objectivity in reviewing the projects of the development agency.

Under this alternative, it would appear necessary that the projects of the development agency not be carried out until the regulatory agency had certified them, after public hearings, as in compliance with the Coastal Plan.

4. A Coastal Grant-in-Aid Fund. An alternative designed specifically to improve processes for the setting of priorities among public programs and expenditures in the coastal zone is to create a special fund for grants to State agencies and local governments for approved projects. Funds could be made available as matching grants to local governments and State departments. These grants would provide the incentive to engage in needed activities, such as marsh restoration, park acquisition, neighborhood rehabilitation, provision of improved transportation facilities, removal of structures blocking views and access, and possibly even reduction in the number of subdivision lots and programs of transfer of development rights within a particular jurisdiction. This alternative would not necessarily require the creation of any new agencies.

5. Project Programming by the Coastal Regulatory Agency. The coastal regulatory agency could be made responsible for preparing an annual report making recommendations to the Legislature for acquisitions, restoration, and redevelopment projects, perhaps including three-year and five-year plans for future projects. This is essentially the technique of "capital improvements programming" used in most cities.

Experience with capital improvement programs suggests that this approach will have the same defects: a tendency to ignore recommendations for annual projects; the program becoming only a compilation of the projects desired by each separate agency involved in coastal activities; lack of secure funding for projects requiring long-term or multi-year funding; and inability to fund projects and take action at the time when action is required (as when a property owner offers property for sale or when a permit request indicates intention to develop). Also this alternative will not provide a way to carry out projects for which no existing agency has authority, such as assembling, resubdividing, and selling subdivided but unbuilt lots along the coast.

Despite these problems, this alternative could be useful in providing a single document where projects that might otherwise be ignored could be brought to the Legislature's attention.

6. A Coastal Conservancy Agency. The last alternative would involve the creation of a Coastal Conservancy Agency, modeled on the California Tahoe Conservancy Agency.

The Tahoe Conservancy Agency was created to assist in implementation of the Tahoe Regional Plan, which is under the jurisdiction (on the California side) of the California Tahoe Regional Planning Agency (CTRPA). The latter

is the planning and regulatory agency; the conservancy agency is empowered to accept and hold land acquired by purchase, gift, or exchange and to develop or provide for the development of such land in accordance with the Tahoe Regional Plan. It may acquire any interests in land and set its own land acquisition policy. It is also intended to be the repository for funds from various sources to be made available for acquisitions. The agency is to be governed by a board of five public members appointed by the Governor, only two of whom may be residents of the region. The agency is not yet functioning because a governing body has not yet been appointed.

The agency is intentionally separate from the California Tahoe Regional Planning Agency, to avoid legal conflicts with the regulatory responsibilities of CTRPA. The actual mechanics of acquisition are to be handled by the State Department of General Services, but the conservancy will make the critical policy decisions—choice of lands to be acquired, priorities for acquisition, whether to acquire fee or lesser interests, assignment of management responsibilities to other agencies, and contracts for use or development allowed by the Tahoe Regional Plan.

A similar agency for the coast, however, would need additional powers to engage in purchase-leasebacks to preserve agricultural and other lands and in acquisition, resubdivision, and re-sale of existing parcels to reduce future development potential and to improve development patterns. As formulated for the Tahoe area, the conservancy would not have the power to engage in development, redevelopment, or restoration projects itself.

The major drawback of this alternative is the potential for competition and inconsistency between the conservancy agency's priorities for land acquisition and the coastal regulatory agency's overall planning role.

GOVERNMENTAL POWERS NEEDED TO CARRY OUT THE COASTAL PLAN

Much of the Coastal Plan will be carried out by the actions of private landowners and developers: they will develop, or not develop, coastal properties in accordance with the Coastal Plan. But no plan can be so specific as to avoid all conflict over interpretation of the Plan; thus some kind of coastal agency is needed to insure that the Plan is indeed followed. To be effective, however, the coastal regulatory agency will need the powers outlined below.

REGULATION OF USE OF LAND AND WATER

The coastal agency will need authority to regulate development so as to insure that Coastal Plan policies are followed. There are three basic ways this can be done:

1. Rules and Ordinances Without Permits. Rules and ordinances could define what may or may not be done (similar to the approach of criminal laws). A landowner or developer may proceed on the basis of these rules without specific project permits; then anyone who believes that the rules are not being fairly followed may go to court to seek to stop the project. This means the Coastal Plan would be enforced only through court action, and in many cases only after coastal resources had been radically altered in preparation for a project.

2. Specific Plans. Under this legally established option, large areas are carefully planned and full hearings are held. Once the plan has been approved by the regulatory agency, development may generally proceed with no further actions except for building permits required by local law. This appears to be a desirable procedure and such specific plans could be based on subregional plans, described under Subregional Planning in Part II of the Coastal Plan. But this option is not suitable for all areas or all projects.

3. Permits for Individual Developments. This is analogous to the permit system under the present Coastal Act, but of course changes could be made in the types of projects for which permits are required. This alternative should also provide, as under the Coastal Initiative, for public hearings on proposed projects having a significant effect on coastal resources. This alternative involves the most processing time for the developer, but provides the greatest assurances for the public that no construction of any sort will actually be begun until the proposed project has been fully evaluated for conformance with the Coastal Plan before a permit is issued.

SUPPLEMENTARY REGULATORY TECHNIQUES

Other aspects of regulating land use can help implement the Coastal Plan. Five specific techniques that may be particularly useful—subdivision laws, dedication and in-lieu fee requirements, density bonuses, requirements for lot consolidation and resubdivision, and transfer of development rights—are discussed below. The first four techniques are in common use by city and county governments in California. The transfer of development rights is a relatively new concept that is in limited use.

1. Revised Subdivision Laws. All division of land in California must conform to the requirements of the Subdivision Map Act, which establishes State standards to be applied by city and county governments. The requirements are mostly procedural. There is no provision for approval by any State agency, except for the current Coastal Commission permit authority over subdivisions within its jurisdictions.

Divisions of land can influence density, design, environmental impacts, and even the type of land use. Fragmentation of the ownership of land tends to make continued agricultural use infeasible, to increase the potential density of development, and to encourage speculation on surrounding land. Subdivision of land contrary to the objectives of the Coastal Plan could result in irreversible commitments and, eventually, harm to the public interest in the coastal zone.

At present, the requirements of the Subdivision Map Act do not provide a means for assuring compliance with the Coastal Plan. Specific policies of the Coastal Plan should be made mandatory in the Subdivision Map Act and applied by local governments in their review of subdivisions along with the other requirements of the Act, or a discretionary permit system over land divisions is needed to implement the Coastal Plan.

2. Dedications and In-Lieu Fees. Several policies of the Coastal Plan call for the dedication of access ways and easements to provide for public access to the ocean. Where dedication is not practical, an in-lieu fee is called for so that better access can be provided elsewhere. Local governments are already empowered to require such dedications or fees in new subdivisions,

and the current Coastal Commission can impose such conditions (but cannot itself collect fees) on any permit for development.

Requirements for private developments to provide access are a reasonable compensation for the increase in demand for open space that they generate and any existing public access they may eliminate. To carry out the Coastal Plan, some agency should have the authority to ensure that every project that adds significantly to the demand for, or that reduces access to the shoreline, contributes to providing access. The agency should also have the authority to use in-lieu fee funds to acquire and improve access in suitable locations.

3. Density Bonuses. Where large parcels of land or several lots appropriate for development are held by a single developer, an increase in density can be offered as an incentive to achieve certain objectives. Density bonuses are frequently used by local governments to encourage innovative design and better use of land. Such special bonuses could also be effective in implementing the Coastal Plan. An increase in density could be allowed for example, where a developer had made special efforts to achieve Coastal Plan objectives as part of the project, perhaps by including extensive public use and access, or by providing low- and moderate-income housing, or by restoring a degraded wetland area.

4. Requirements for Lot Consolidation and Resubdivision. Many Coastal Plan policies address the problems posed by the thousands of existing, subdivided lots along the coast. Where contiguous lots are in common ownership (that is, if they have been subdivided but not yet sold), consolidation of lots can be required to meet certain standards. This was done throughout California when the present Subdivision Map Act was first enacted in 1937. A recent ordinance in Madera County (upheld in the California Court of Appeals) effectively consolidated parcels to achieve minimum lot sizes for agriculture.

Similar legislation may be needed to carry out many of the policies of the Coastal Plan. If existing subdivided parcels in common ownership were to revert to acreage, the owners would be able to resubdivide or develop in accordance with new requirements that could assure protection of coastal resources.

A more difficult problem is presented by individually owned lots, because each owner has no control over other lots. It may be legally possible to require lot consolidation even in this situation if, for example, little development has occurred and if owners could meet new requirements by buying adjoining lots. But such stringent requirements, imposed after people have already bought parcels with local government approval, may well be beyond the reasonableness and equity of regulatory powers. Yet development of these fragmented lots often threatens coastal resources and would harm the public interest. A program of financial incentives for voluntary lot consolidation may be able to achieve coastal policies in some of these cases. In other cases, positive public action (such as acquisition and resubdivision) may be required.

5. Transfer of Development Rights. An innovative technique recently developed to preserve historical landmarks and areas of special environmental value is transfer of development rights (TDRs). This involves shifting the right to develop from an area where development is not desired to an area

where it is. TDR separates the right to develop from the right of ownership of the land. The landowner who is not allowed to develop can sell his development rights to a landowner in an area specified for development; the latter can then build at a higher density. Thus it makes possible limitation of development in an area without excessive economic losses to individuals.

ACQUISITION AND POSITIVE PUBLIC ACTION

Many policies of the Coastal Plan call for preservation, restoration, and provision of public services or development. These cannot be achieved by regulation or by private development alone, and will require other governmental actions.

Some resources should be completely preserved—for example, a wildlife sanctuary, an archaeological site, or a spectacular scenic viewpoint. In areas where coastal resources should be set aside for public use, acquisition should be planned. In other areas, partial acquisition could achieve the objectives of the Plan. Perhaps this could be done through dedication rather than outright purchase, or purchase of easements and development rights rather than of all the land rights in the parcel.

As noted above, it may be decided that a single agency should be responsible both for regulation and restoration/development, or that separate agencies are desirable to carry out these various powers in implementing the Coastal Plan.

COSTS OF CARRYING OUT THE COASTAL PLAN AND POSSIBLE SOURCES OF FUNDS

COSTS

The costs of carrying out the Coastal Plan are of two types: (1) the administrative costs (office rent, travel, agency and staff salaries) of regulating the use of land and water in accordance with the Coastal Plan and of keeping the Coastal Plan up to date through further studies, hearings, etc.; and (2) the acquisition and development costs of Coastal Plan policies calling for preserving wetlands, acquiring new park and recreation areas and scenic areas, etc. These costs may be borne at different levels of government depending on which bodies—local governments, existing State agencies, or a successor coastal agency—are designated to carry out portions of the Plan.

Unfortunately, precise cost estimates cannot be provided at this time. The administrative costs will depend in large measure on the type of agency selected and, if it is a State agency, on whether or not it has regional divisions or offices. Similarly the acquisition and development costs will depend on appraised values of coastal properties at the time acquisition is proposed, on levels of inflation, etc.

Nonetheless, some guidance may be given, at least as to the administrative costs, by the experience of the Coastal Commissions. Further staff work is underway to try to analyze this experience and apply it to future costs.

SOURCES OF FUNDS

Some possible sources of funds to carry out the Coastal Plan are outlined below.

1. Permit Fees. If a regulatory permit system were to be adopted, a system of permit processing fees similar to the one now in effect could yield from \$500,000 to \$1.5 million per year, depending on the size of the permit area.

2. Grants Under the Coastal Zone Management Act of 1972. The Federal Coastal Zone Management Act provides funds to help finance states' coastal management. Because the Federal grants must be matched with state or local funds, revenue will be needed to provide the matching funds. Permit fees and direct state appropriations made to finance planning and regulatory activities would qualify. It is impossible to predict at this time the amount of funds that the Congress will appropriate for this program in future years (the initial grant to California was \$720,000). California could, however, expect to receive a fair share of any funds made available under this program, because California's coastal zone management program should fully meet the Federal requirements.

3. State Tax Revenues. These could be from the State General Fund, or perhaps from special taxes. One alternative is that only users of the coast or those who benefit directly from coastal resources should pay for coastal protection. Another is that because the coast is an area of importance and benefit to all Californians, they should help pay for its management. The following three types of tax address both these views:

a. State Transient Occupancy Tax. This tax is equivalent to a sales tax on hotel and motel room rentals. It is presently levied by almost all counties and cities in the State; there is no State tax. The typical local rate is five per cent—the maximum rate permitted under State law, except for chartered cities and counties. The rationale for increasing the rate of this tax to finance coastal activities is found in the strong attraction of the coastal zone and its natural and manmade resources to tourists and State residents travelling within the State. The tax is one means by which the benefits of carrying out the Coastal Plan could be financed in part by those who visit and make use of the coast, including out-of-State visitors and inland residents.

b. State or Coastal Property Transfer Tax. The property transfer tax is currently used exclusively by counties and cities under uniform State legislation. The allowed rate is 55¢ per \$500 of equity transferred, or 11/100 of 1 per cent, a very low rate. Statewide, this tax generated \$27 million in 1972-73 from a revenue base of \$25 billion in values of property transferred. An additional 10¢ per \$500 (for a total rate of 65¢ per \$500), or indeed even a more substantial increase, would have no real effect on real estate transactions and would not reduce existing local receipts. A statewide rate of 10¢ per \$500 would generate \$5 million in State revenues. It is possible to levy such a tax only within the coastal area. Within a 1,000-yard coastal area, such a tax would raise about \$200,000 per year at a rate of 10¢ per \$500; an increase of 50¢ per \$500 would raise \$1 million. However, the proper taxing area would be difficult to identify, enforcement would be costly, and there could be some unexpected effects on the real estate market, such as increased use of leases, rather than sales to market property.

c. Oil Export-Import Tax. An excise tax on petroleum exports and imports has been suggested by Controller Ken Cory, to finance research and development on oil spill cleanup and for coastal land acquisition. It is estimated that such a tax might produce \$6 million a year.

4. State Bond Issue. Another funding source besides fees, taxes, and grants is State bonds. The most recent State bond issue for park acquisition was the \$250 million approved by the voters in June 1974, and another bond issue specifically for acquisition of additional coastal properties is a possibility.

5. Tideland Oil Revenues. Tideland oil revenues are derived directly from depletion of resources in coastal waters and submerged lands, and should be considered to fund protection of other coastal resources. Given the most liberal estimates of other demands on those revenues and assuming a renegotiation of existing leases, at least \$50 million annually should be available for coastal activities and it is probable that over \$100 million would be available, if the Legislature assigned highest priority to coastal conservation.

CONCLUSION

Government, powers, and funding. These are the keys to successfully carrying out the Coastal Plan, in whole or in part. But the choices are not easy. The foregoing is intended to provide material for informed discussion towards the evolution of a workable management system for recommendation to the Governor and the Legislature in the final Coastal Plan.

SUMMARY OF KEY ISSUES IN CARRYING OUT THE COASTAL PLAN

To assist the public in evaluating the several options for carrying out the Coastal Plan, the key issues in determining the most effective arrangements are set forth below, with cross-references to the pages that cover each issue.

A. Level of Government. What level(s) of government should be responsible for carrying out the Coastal Plan?

- (1) State government entirely, with minimal participation by local governments. (Alternatives 1, 2, and 3, on pages 297-98.)
- (2) Local governments entirely, with no State coastal agency. (Alternative 4, page 298.)
- (3) Primarily local governments, but with a State coastal agency to coordinate continued coastal planning and to ensure, through an appeals procedure, that local decisions are in fact in conformity with the Coastal Plan. (Alternative 5, pages 298-99.)

B. Kind of State Agency. If a State agency is to be involved, what kind of State coastal agency should be established to carry out the Coastal Plan?

- (1) A coastal agency that would be part of an as-yet-not-established statewide environmental and land use agency. (Alternative 1, page 297.)

- (2) A single State coastal agency, with no regional commissions but possibly with regional offices for public accessibility. (Alternative 2, page 297.)
- (3) A State coastal commission and regional coastal commissions (essentially the present arrangement, though perhaps with some change in regional boundaries). (Alternative 3, pages 297-98.)

C. Composition of State Agency. How should a State coastal agency be constituted? (See pages 299-300.)

- (1) With part-time members, as at present, half chosen by or from local government and half appointed to represent the public.
- (2) A small, full-time appointed board (5 to 9 members) similar to the State Water Resources Control Board.
- (3) A small, full-time board with members directly elected by the people of California.

D. Delegation to Local Government. If a State coastal agency is established, how should it delegate responsibilities to local government?

- (1) Local plans would be required to conform to the Coastal Plan; local governments would make all coastal decisions. The State agency would be empowered only to bring suit if it thought a local decision was contrary to the Coastal Plan. Resolution of conflicts would be done by the courts, not an administrative coastal agency.
- (2) The State coastal agency (with or without regional components) would approve local plans as being in conformity with the Coastal Plan; local governments would issue permits pursuant to such approved local plans. Appeals could be made to the coastal agency from local actions either approving or denying projects on the basis of conformity (or lack of conformity) to the Coastal Plan.
- (3) Same as (2), but in addition, the State coastal agency (with or without regional components) would have direct permit jurisdiction over a zone consisting of critical coastal resources, such as coastal waters, beaches, and wetlands, and over certain important development decisions, such as roads or major sewer systems.

E. Regional Boundaries. If there are regional commissions (or regional offices of a State coastal agency), what should the regional boundaries be? (See page 299.)

- (1) Same as at present.
- (2) Same as regional Councils of Governments (i.e., ABAG, AMBAG, SCAG).
- (3) Maintain boundaries as at present, but empower State coastal agency to change them on the basis of future study.

F. Land Sale/Resale Authority. Should a new State agency be created to assemble, resubdivide, and resell coastal lands to help achieve objectives of the Coastal Plan? (See pages 301-04.)

- (1) No, this should be left to the redevelopment capability of local governments and existing State agencies.
- (2) Yes, but this should be done in urban areas only if local urban renewal agencies fail to carry out Coastal Plan objectives; it is, however, needed immediately to protect rural areas from cumulative, sprawling development inconsistent with the Coastal Plan.

G. Revenue from Petroleum Production. Should revenues from offshore petroleum production be used to help carry out the Coastal Plan and to purchase coastal properties for recreation and preservation? (See page 309.)

- (1) No, because this will give the future coastal agency too much incentive to approve unwise projects solely to receive revenues from them.
- (2) Yes, because this will be revenue only from projects that will win approval on their merits, as specified in the Coastal Plan, and it is entirely fitting that funds from coastal resource extraction help finance coastal resource protection.

Additional Actions by Other Agencies

Many aspects of the Coastal Plan should be carried out along the lines of one of the alternatives outlined in the preceding section. Other aspects of the Plan should be carried out through private investment in various developments that meet the Plan's policies. Still other aspects of the Plan will require new legislation and new programs by existing governmental agencies.

The following pages list the Plan's proposals for new laws and for new actions by existing agencies. Where a review of present law clearly indicates the appropriate agency, it is shown. But many of the new programs require further study before the best solution will be clear.

All of the proposals in this section need not be carried out immediately, nor will all be financially feasible immediately. But many are of great importance (these will be emphasized in the final Coastal Plan), and all deserve careful consideration if the full mandate of the Coastal Act is to be ultimately achieved.

All of the recommendations listed here have been adopted by the State Commission as part of the various Plan elements considered to date. They are combined for clarity into: (1) recommendations for new legislation, and (2) recommendations to other agencies. Within these sections, they are grouped by chapters corresponding with Part II, Findings and Policies.

RECOMMENDATIONS FOR NEW LEGISLATION

MARINE ENVIRONMENT

* Require that bonds be posted for activities potentially hazardous to water resources and wildlife; applicants for State offshore drilling must show evidence of secured financial responsibility in the amount of \$20 million for each individual lease. All drilling applicants and owners and operators of tankers operating in California waters must register with the Secretary of State for service of process. (See Policies 10 and 11.)

* Establish liability of up to \$20 million for owners and operators of oil production, processing, or transportation equipment and up to \$100 million for owners and operators of terminals. (Policy 11)

* Establish an Oil Spill Liability Fund by imposing a tax of two cents on each barrel of petroleum produced on State lands or entering California, administered by the Resources Secretary, to provide all clean-up costs and to compensate all damages caused by oil discharges in coastal waters. (Policy 11)

* Urge the Federal government to create a similar oil spill liability fund at the national level, precluding the need for a State Fund. (Policy 12)

* Develop programs for fisheries control with adjacent states; participate in appropriate organizations; support international fisheries control. (Policy 2)

* Designate and enable an appropriate State agency to phase out or upgrade marine structures that adversely affect water circulation. (Policy 18)

* Designate a State agency to undertake a comprehensive fisheries management and ocean water quality research and regulatory programs, including: (1) regulation of commercial and sports fisheries to assure sustained yields over time; (2) expanded research and development of baseline studies; (3) evaluation of all hazardous discharges and activities affecting the marine environment; (4) development and enforcement of regulations to prohibit or control highly toxic substances; (5) habitat restoration and kelp propagation programs; (6) development of hatcheries and stocking programs; and (7) research and monitoring of fish populations. (Policies 2, 5, and 10)

* Consider programs to assure adequate berthing and support facilities for commercial fishing boats. (Policy 4)

* Require vessel fueling and deballasting equipment and practices that eliminate routine leaks and spills of oil and fuel. (Policy 10)

* Prohibit the manufacture or sale of harmful types of boat paints. (Policy 10)

COASTAL LAND ENVIRONMENT

* Require all local governments to provide for water conservation in their planning and building code programs and to establish impervious surface limitations, flood plain zoning, and other development standards designed to protect groundwater recharge and surface drainage areas. (Policies 24 and 25)

* Prevent unwarranted conversion of agricultural lands to urban development through regulation, development easement or purchase-leaseback techniques, enforcement of Article 28 of the California Constitution, State subdivision regulations, and other laws regulating the use of land. (Policies 30-33 and 36)

* Consider amendments to the tax code to support land use controls preventing unwarranted conversion of agricultural lands (e.g., a land gains tax, inheritance tax changes, possible changes in the Williamson Act). (Policy 36)

* Consider other measures to encourage agricultural land uses, including farm loans or subsidies, multiple use of farmlands, research in new crop strains, pest control management, agricultural pollution controls, the use of reclaimed water, and soil conservation practices. (Policy 36)

* Amend the tax laws to encourage a sustained-yield basis for timber production in California. (Policy 39)

* Incorporate protection of high-quality commercial timberlands in forestry and subdivision laws. (Policy 37)

* Designate, preserve, and restore rare or endangered plants and natural communities (patterned after legislation protecting endangered species). (Policy 26)

* Designate an agency with regional jurisdiction to manage the coastal stream system on a comprehensive, watershed basis. (Policy 19)

* Enable and fund the Department of Fish and Game to systematically survey anadromous fish streams for various data. (Policy 22)

MANMADE RESOURCES

* Authorize cities and counties to contract with owners to preserve historic buildings and features in return for reduced property tax assessments. (Policy 46)

* Formulate criteria for determining significant archeological and paleontological resources and develop a program for the protection and, where appropriate, professional excavation and study of the resources. (Policy 46)

APPEARANCE AND DESIGN

* Provide funds to local communities to develop and implement Design Elements for general plans. (Policy 49)

* Consider legislation to prohibit the sale of non-returnable glass bottles, aluminum and pop-top cans, and non-biodegradable plastic packaging. (Policy 52)

PUBLIC ACCESS TO THE COAST

* Provide funds for the acquisition of urban waterfront lots, presently subdivided small coastline lots in scattered ownership, and other designated acquisition areas. (Policy 65)

* Preserve and maintain the public's right, acquired through historic use and custom, to use dry sand and rocky coastal beaches to the first line of terrestrial vegetation and those bluffs and headlands customarily used by the public. (Policy 62)

* Provide that, in judicial proceedings, showing that an area is a coastal beach establishes a presumption that the public has traditionally used the area for recreational purposes. (Policy 62)

* Amend the Subdivision Map Act to provide for State review and approval of local determinations that public access is available within a reasonable distance from the subdivision. (Policy 63)

* Extend the statute of limitations on government acceptance of coastal access dedications to ten years. (Policy 63)

* Require that governmental agencies issuing permits for coastal development require dedication of public access or payments of in-lieu fees equivalent to the cost of acquiring access. (Policy 63)

* Authorize a State agency to receive and manage public accessways, to require payment of in-lieu fees, and to exercise the power of eminent domain and expend fees in purchasing public accessways. (Policy 63)

* Continue efforts of the Attorney General's office to actively enforce the public's rights to coastal access. (Policy 63)

* Enact measures to preserve existing low- and moderate-income housing in the coastal zone and to provide new housing and tourist facilities for low- and moderate-income persons. (Policies 71 and 72)

* Strictly regulate the conversion of rental housing to condominiums. (Policy 72)

RECREATION

* Establish a coastal reserve system, including marine, land, and manmade resources especially valuable for educational and scientific use, and establish a Coastal Reserve Board to coordinate and advise regarding areas to be included and appropriate management. (Policies 88-90)

* Designate a State agency to inventory natural habitat areas and establish the acreage needed so that additional reserve areas can be identified for acquisition. (Policy 88)

* Increase funds for acquisition of recreational lands and their development and management for public recreation. (Policies 75 and 95)

* Provide funds to establish and maintain a coastal trails system and authorize the State Department of Parks and Recreation to use the power of eminent domain for acquisition of trails where necessary. (Policy 91)

* Provide State financial support, where appropriate, to local governments for maintenance of beaches used heavily by non-residents. (Policy 96)

* Authorize a State agency to regulate and assist in: (1) developing dry storage and stacking devices for pleasure craft; (2) increasing the number of public launch facilities; (3) expanding berthing in existing harbors; (4) designating sites for new harbors; (5) encouraging multiple ownership of boats; and (6) developing incentives for marinas to give priority to rental craft. (Policy 93)

* Authorize the Department of Parks and Recreation to establish a centralized statewide reservation system for overnight recreational facilities. (Policy 79)

TRANSPORTATION

* Mandate that the Circulation Elements of local general plans include a section on bike paths and bike lanes. (Policy 97)

* Require that local, regional, and State transportation plans include consideration of recreational travel, emergency travel, and energy-conserving and non-air-polluting transportation modes. (Policy 97)

* Provide increased funding for mass transit, with funding priority for feasibility studies for alternative transportation systems, seed money for new transit services, ongoing operating subsidies, and demonstration projects. (Policy 107)

* Encourage Amtrak and rail companies operating in the coastal zone to expand rail service. (Policy 110)

ENERGY

* Authorize the State Energy Commission to review all development proposals related to oil and gas production, processing, and transmission facilities as well as power plants. (Policy 131)

* Adopt measures encouraging the elimination of energy inefficiencies in existing buildings, automobiles, appliances, and public lighting systems (e.g., special loans, tax incentives, etc., where appropriate). (Policies 123 and 127)

* Provide tax incentives to promote installation of low- or non-fossil fuel energy systems. (Policy 128)

* Require that local governments adopt "sun rights" ordinances to ensure that building owners have access to sun radiation. (Policy 129)

* Enable and fund State agencies to research and develop alternative sources of energy. (Policy 130)

* Seek agreement from the U.S. Department of Interior that Federal OCS development will be consistent with the standards and practices of State agencies and the policies of the Coastal Plan. (Policy 145)

* Petition the U.S. Coast Guard to require and enforce specified tanker design and performance capability to minimize oil spill risks and to apply strict marine traffic and vessel control during loaded LNG carrier operation in terminal areas. (Policies 157 and 159)

* Authorize the Division of Oil and Gas to regulate petroleum production and completion practices in order to increase efficiency and to require submittal of original exploratory and production data from surveys or drilling of wells within 60 days after finishing. (Policies 143 and 144)

DEVELOPMENT

* Require that local governments adopt, implement, and enforce those chapters of the Uniform Building Code pertaining to geological hazards and grading. (Policy 171)

* Enable and fund local agencies to conduct geologic evaluations and to restrict or require adequate engineering specifications to assure site stability and structural safety in hazard areas. (Policy 171)

* Assign, empower, and fund a State agency to designate geologic risk areas, recommend and impose appropriate land use and building regulations related to the designations, to establish criteria for local government review of construction in hazard areas, and to review and approve local plans and building code standards and enforcement for consistency with the designations and goals it develops. (Policy 171)

* Authorize this agency to enforce standards and site review for proposed State projects and for advisory review of Federal projects. (Policy 171)

* Require that geologic hazards information be included as part of the chain of title to property and be incorporated in the title report and the report for subdivisions filed with the Real Estate Commissioner. (Policy 173)

* Provide that there is no presumption of public liability for property loss (disaster loans or forms of insurance borne by the general public) due to construction in geologically unstable locations and that occupants and future purchasers of such construction be advised of the hazard. (Policy 172)

* Require that local governments within the 100-year tsunami run-up zone include within their Safety Elements a disaster preparedness plan. (Policy 176).

RESTORATION OF COASTAL RESOURCES

* Provide funds to local governments for restoration planning and improvement programs and for the redevelopment of blighted urban areas when rehabilitation efforts are not adequate to relieve blighted conditions. (Policy 182)

* Require posting of financial security to assure the completion of resource restoration or protection activities necessary to offset unavoidable resource degradation. (Policy 180)

SUBREGIONAL PLANNING

* Provide State grants, similar to the Federal 701 planning program, to assist local governments in their preparation of subregional plans and plans pursuant to the subregional plans. (Policy 183)

RECOMMENDATIONS TO OTHER AGENCIES

MARINE ENVIRONMENT

The State Water Resources Control Board, the Regional Water Quality Control Boards, and other appropriate State and local agencies should revise water quality standards, including: (1) upgrading of municipal and industrial waste discharges to meet the standards of the 1972 amendments to the Federal Water Pollution Control Act; (2) phasing out of discharges to enclosed waters except where they enhance water quality; (3) restricting the extension of sewer service in systems with substandard treatment facilities; (4) pretreating toxic and hard-to-treat industrial wastes that cannot be effectively or economically handled at municipal treatment plants; (5) monitoring thermal discharges and requiring mitigation or alternative systems where adverse impacts are found; (6) developing and enforcing a runoff, erosion, and silt control ordinance; (7) controlling runoff containing substantial amounts of contaminants through pretreatment or containment; (8) researching the effects of thermal discharges, entrainment, oil spills, and heavy metals on the marine environment; and (9) developing methods of tagging or fingerprinting oil and of preventing, containing, and cleaning up oil spills. (Policies 5, 6, 9, 10, and 13)

The Environmental Protection Agency and the U.S. Coast Guard should vigorously enforce standards on vessel discharges. (Policy 8)

COASTAL LAND ENVIRONMENT

The Department of Water Resources, the Water Resources Control Board, the Department of Fish and Game, and appropriate Federal agencies should prepare a comprehensive watershed plan for the coastal zone, including: (1) measures for the protection of anadromous fish habitats such as systematic stream surveys, water quality regulations, habitat restoration, and expanded enforcement activity; and (2) research on the effect of coastal mining and the movement of sand along coastal stream on the marine environment. (Policy 19)

The Department of Water Resources, the Department of Navigation and Ocean Development, the Division of Mines and Geology, State Lands Commission, the Department of Parks and Recreation, etc., should participate in sand supply and movement research and restoration programs. (Policy 23)

The Department of Water Resources should expand its programs of gathering and disseminating information on water supply and researching and implementing water conservation and reclamation measures, giving emphasis to the benefits of water reclamation and assisting local programs. (Policy 24)

Local agencies and utilities should develop water management plans based on thorough evaluations of hydrologic conditions and on regional basin plans; development decisions should be related to an inventory of water supplies, wastewater management, and water conservation measures. (Policies 24 and 25)

The State Division of Forestry should strictly regulate timber harvesting in key watershed areas and along stream banks, including the establishment of buffer zones with the assistance of other agencies, and should undertake programs to rehabilitate forest areas as part of the watershed plans for the coastal zone. (Policies 37 and 38)

The Division of Mines and Geology should: (1) adopt and enforce uniform statewide regulations to provide a minimum level of control of noise, dust, surface water pollution, waste materials and dredge spoils disposal, and reclamation for extractive sites; and (2) inventory the location, quantity, and quality of resource deposits in the State to reduce the pressure to mine sand and gravel and other non-petroleum mineral resources in fragile coastal areas and to identify suitable mining sites. (Policies 41 and 42)

The Air Resources Board and those agencies now preparing Air Quality Maintenance Plans should design and implement programs to improve air quality and pollution control technology. (Policy 44)

MANMADE RESOURCES

Communities and neighborhoods identified as special coastal resources should not allow developments that are out of scale, size, or social character within their jurisdictions and should involve local residents in determining the particular values of their areas and how new development can accommodate them. (Policy 45)

The State Historic Preservation Officer should complete a comprehensive survey and develop plans for the protection of historic and pre-historic resources of the coastal zone. (Policy 46)

APPEARANCE AND DESIGN

Coastal cities and counties should: (1) develop and incorporate Design Elements in their general plans; (2) formulate definitive design criteria for improving the appearance along the shoreline; (3) undertake visual inventories as needed; and (4) establish Design Review Boards. (Policies 49 and 50)

The Department of Parks and Recreation, the Department of Transportation, local agencies, and other appropriate agencies should give high priority to maintaining road turn-outs, recreation areas, and other such coastal areas free of litter. (Policy 52)

The Public Utilities Commission should develop a program of undergrounding existing and new distribution and transmission facilities in the coastal zone, with priority for undergrounding of existing facilities in highly scenic areas. (Policy 59)

PUBLIC ACCESS TO THE COAST

The Department of Parks and Recreation, the Department of Fish and Game, the Department of Transportation, and other State agencies and local agencies authorized to acquire recreational and open space lands in the coastal zone should work toward the long-term goal (possibly 50 years or more) of acquiring a strip of land paralleling the coast, which has statewide and regional significance. Techniques such as design control, incentive zoning, purchase and leaseback, exchange of development rights, scenic easements, dedications, etc., should all be utilized as appropriate. (Policies 64 and 66)

The Federal government should increase public access to the coastal areas of Federal military installation to the maximum degree consistent with military security and safety requirements and environmental protection and should make surplus lands available for public purposes. (Policy 69)

RECREATION

The Department of Parks and Recreation, local park and recreation departments, and private organizations concerned with such matters should develop a long-range program to manage coastal recreational resources, including: (1) giving preference to uses requiring few physical facilities or environmental modifications; (2) providing for transit, shuttles, or paths from upland parking to shoreline recreational facilities (local agencies and transit districts should assist in this effort); (3) giving preference to coastal- and water-dependent uses in the shoreline area; (4) reserving and developing upland support areas for public and commercial recreational facilities that would otherwise require shoreline areas; and (5) continuing research on the concept of recreational carrying capacity and other aspects of recreation planning. (Policies 74-87)

In addition, the Department of Parks and Recreation should coordinate the development of a coastal trails system, including connecting a statewide system with paths, linear parks, and locally owned trail and park systems. (Policy 91)

The State Department of Education, the Department of Parks and Recreation, and local school and park districts should expand information and interpretive programs to encourage proper use of coastal resources and expand school and public education programs on the coastal environment. (Policy 87)

The Department of Parks and Recreation, the Department of Fish and Game, and other State agencies authorized to acquire lands in the coastal zone should recommend additional ecologically significant areas for acquisition. (Policy 90)

TRANSPORTATION

The Department of Transportation should: (1) develop a scenic route system on coastal roads, including construction of improvements for scenic viewing, picnicking, pedestrian and bicycle traffic, and off-road parking, preferably on the inland side of the road; (2) restrict parking on the seaward shoulder of such routes; (3) improve inland travel routes that might relieve traffic on coastal roads; (4) allocate a substantial portion of the capacity of Highway 1 to recreational use; (5) plan for the special transportation needs of the handicapped and of recreational users such as surfers and bicyclists; (6) study the feasibility of a recreational and commuter ferry system; (7) give preference to public transit over new or expanded roads and parking lots for automobiles; (8) base decisions about capacity increases on the sensitivity of resources to increased access and on coastal land use policies; (9) minimize environmental impact of road construction; and (10) consider emergency and weekend transportation needs. (Policies 97-111 and 120)

Port and harbor agencies should prepare or update Port Master Plans that coordinate vessel traffic, maximize use and efficiency of existing facilities, and provide for any necessary improvements with the least environmental damage. (Policies 117 and 119)

Local governments, local and regional transportation planning agencies, and transit districts should: (1) coordinate transit to and from the coast; (2) adopt measures to encourage the growth of mass transit within coastal communities; and (3) promote development of multi-use recreational centers and land use patterns that can be served by transit. (Policies 108-111)

ENERGY

The State Energy Resources Conservation and Development Commission should: (1) consider energy conservation standards for lighting, heating, and cooling, and natural gas use; (2) establish an energy budget code for individual buildings; (3) devise programs to encourage energy conservation in existing buildings, design of automobiles and appliances, and public (i.e. outdoor) lighting systems; and (4) encourage the development and application of alternative energy sources including solar, wind, geothermal, solid and liquid wastes, and methanol. (Policies 122-130)

The State Public Utilities Commission should revise utility rate structures to discourage inefficient and wasteful uses of energy. (Policy 121)

The State Lands Commission should: (1) require preparation of 1-, 5-, and 10-year plans for all related offshore and onshore development prior to approval of drilling; (2) submit specifically requested lease provisions relating to environmental impacts to the coastal agency before lease bidding; (3) consider the possibility of public access and multiple use of any proposed new drilling and production islands; and (4) require unitization of facilities wherever possible. (Policies 137-144)

The Division of Oil and Gas (Department of Conservation) should: (1) assist in the development of alternative energy sources, particularly geothermal energy; and (2) receive and make public within one year of submittal all exploratory and production data from surveys or drilling of wells in California. (Policies 130 and 144)

The Geothermal Resources Board, the Solid Waste Management Control Board, and the State Water Resources Control Board should take action to expedite the development of geothermal, solid, and liquid wastes as alternative energy sources. (Policy 130)

DEVELOPMENT

Local utility, transportation, and assessment districts should coordinate their plans for major sewer, water, and road systems in the coastal zone with the coastal agency. (Policy 169)


The State Division of Mines and Geology (Department of Conservation) should advise the coastal agency on review of development projects in geologically hazardous areas. It should have a review team available for this purpose with expertise in various fields. (Policy 174)

RESTORATION OF COASTAL RESOURCES

Local agencies in areas that have been degraded should develop and implement long-range restoration programs. (Policy 182)

SUBREGIONAL PLANNING

Local governments, regional agencies, State agencies, and citizens groups in areas where the cumulative impact of development over time has the potential for adversely affecting coastal resources or coastal access should prepare subregional plans and refine and apply these with enforceable plans and programs. (Policy 183)



Part IV: Resource and Plan Maps

Mapping the Preliminary Plan

The maps that follow show the distribution of coastal resources as described in the Plan policies for the entire coastal zone and illustrate how the Plan policies could be applied to specific coastal areas, pointing out problems that need to be addressed and, in some cases, indicating possible solutions.

These maps were prepared by the Regional staffs under the supervision of the Regional Commissions, but it is important to note that they have not been formally approved by any of the Commissions. During the coming months these maps will be reviewed in public hearings and may be revised. In the fall, revised Plan Maps will be approved by the State Commission for inclusion in the final Plan to be recommended to the Governor and the Legislature.

The purpose of these maps is to illustrate the application of some of the Plan policies. They are preliminary proposals only pending further review. It is expected that each Regional Commission will have supplemental maps showing at a larger scale and in more detail the distribution of coastal resources identified by Plan policies and the application of Plan policies to more geographically specific areas than can only be shown on maps of the scale in this report.

Following is a summary description of the content of each map as well as the available sources of information used in preparing them.

Coastal Resources Map

The purpose of this map is to identify the general location and distribution of key coastal resources described in the statewide findings and policies. The coastal resources have been grouped into five major categories: (1) Productive Resource areas, including agricultural lands, range lands, timber lands, and mineral areas; (2) Sensitive Biological Areas, including marine, wetland and estuary, and land habitat conditions; (3) Major Recreation Areas, including public and semi-public parkland, marinas, and special water areas of value for recreation; (4) Developed Areas, and (5) Areas of Potential Hazard to Public Safety. Additionally, a Coastal Zone Boundary as proposed—but not formally adopted—by the Regional Commissions is illustrated and significant public and semi-public ownerships are shown.

Because of the limitations imposed by the scale of this map, mutually exclusive resource areas cannot be entirely shown. Resource areas shown on the map represent the landscape type judged predominant by the Regional planning staff. Certain key resources that are geographically less dominant than others are shown, where possible, by special notation to indicate their general location. Shown at the left side of each map are lists of critical environmental features too small to map at this scale, along with other special qualifications pertaining to each map.

Descriptions of each of the mapped categories follows below.

PRODUCTIVE RESOURCE AREAS

AGRICULTURE

Four categories of agricultural land have been aggregated under this heading:

1. Prime agricultural land as defined by Government Code Section 51201(c) (Williamson Act; see definition, page 59).
2. Areas capable of supporting coastal-dependent crops and currently in crop production (agricultural lands of any soil class capable of supporting crops that cannot grow in inland areas away from coastal climatic influence).
3. Areas supporting coastal-related crops (non-prime agricultural lands of any soil class other than I and II currently supporting crops that may grow elsewhere but grow better in areas influenced by the coastal climate).
4. Other land managed for intensive agricultural use, including crops or floriculture, but not rangeland grazing.

Available Sources:

Office of Planning and Research maps of prime agricultural land at scales of 1:62,500 and 1:250,000; various Soil Conservation Service County maps and reports; communications with county offices of the Agricultural Extension Service and the Agricultural Commissioner's Office; U.S. Soil Conservation Service district offices; coastal climate maps prepared by Marston Kimball, Extension Bioclimatologist, Agricultural Extension Service, Davis, California, 1964; local, State, and Federal land use inventories, including Department of Water Resources inventories at 1:24,000 scale and the California Region Comprehensive Framework Study, 1972.

GRAZING

Land currently being used for grazing livestock that does not fall into the above classification of "prime agricultural land" or "other land managed for intensive agricultural use."

Available Sources:

Land use inventories as mentioned above; personal communication with local Farm Advisors; Prime Rangeland Soils maps (1:125,000) of the coastal counties by Darwin Briggs, Planning Staff Leader, Soil Conservation Service, Davis, California, 1974

COMMERCIAL TIMBER LAND

All land currently being managed for commercial timber purposes (usually classified as Site I, II, or III).

Available Sources:

State Division of Forestry, U.S. Forest Service Regional Forester, and local timber operations.

OTHER TIMBER LAND

All remaining timber land not being managed for commercial timber purposes or grazing.

Available Sources:

Same as for Commercial Timber Land.

MINERAL RESOURCE AREA

Two categories of mineral resources are aggregated under this heading:

1. Major extraction sites for sand and gravel and other non-petroleum mineral resources in current operation and historic sites which have not been restored or converted to another use, and
2. Extraction sites for petroleum resources, including oil and natural gas, but not the spatial extent of un-mined petroleum fields.

Available Sources:

Local studies by Division of Mines and Geology; Local land use surveys; statewide mapping (1:1,000,000) by Division of Mines and Geology; studies by BLM, State Lands Commission, and Division of Oil and Gas; local land use inventories; California Region Comprehensive Framework Study.

SENSITIVE BIOLOGICAL AREAS

SPECIAL MARINE HABITAT

To the extent that they are mappable, all offshore water areas and rocky intertidal areas of marine habitat value, such as: kelp beds; existing Marine Life Refuges; designated Areas of Special Biological Significance; ocean water identified by California Natural Areas Coordinating Council; coastal waters of educational and scientific value as identified in the Comprehensive Ocean Area Plan, Appendix IX; marine mammal and sea bird breeding sites in coastal waters; proposed marine preservation areas as identified in the California Coastline Preservation and Recreation Plan; and other areas of acknowledged marine habitat value. Coastal sport and commercial fisheries are not shown because of their exceedingly large range.

Available Sources:

Special studies by: Department of Fish and Game, Department of Parks and Recreation, Department of Water Resources, and State Water Resources Control Board. Key publications include: Comprehensive Ocean Area Plan, Appendices III and IX, Department of Parks and Recreation's California Coastline Preservation and Recreation Plan, and SWRCB Resolution 74-28.

COASTAL WETLAND OR ESTUARY

To the extent that they are mappable, areas shown as wetlands include salt and freshwater marshes, mudflats and their immediately adjoining upland habitat zone, and also coastal lowlands "covered periodically or permanently with water" that are of critical value to either fish or wildlife or both. Included in estuaries are sheltered waters of estuaries, lagoons, sloughs, and mouths of streams and rivers (COAP Appendix III, page 44, and Marine Environment Policy).

Available Sources:

Wetland studies by Department of Fish and Game; Acquisition Priorities for the Coastal Wetland of California; California Coastline Preservation and Recreation Plan; and COAP Appendices III and IX.

SPECIAL COASTAL LAND HABITAT

To the extent that they are mappable, areas shown as coastal land habitat in all land areas supporting coastal-dependent or related plant and/or animal life and all other land areas falling in the coastal zone that are of acknowledged habitat value. Criteria for habitat value include: "(a) restricted natural communities—ecological areas which are scarce, involving only limited area; (b) rare and endangered wildlife species habitat; (c) rare and endangered plant species range; (d) specialized wildlife habitat; (e) outstanding representative natural communities; (f) sites with outstanding aesthetic or educational value; (g) wilderness or primitive areas" (adopted Coastal Land Policy Specialized wildlife habitat include, but are not limited to; along all intermittent and perennial rivers, streams, lakes..."—Coastal Land Policy .

Anadromous fish (salmon, steelhead, etc.) spawning streams and rivers are mapped to the extent that the primary channel can be shown.

Available Sources:

California Coastline Preservation and Recreation Plan; California Natural Areas Coordinating Council; California Native Plant Society; Protected Waterways Program; COAP Appendices III and IX; and Department of Fish and Game.

MAJOR RECREATION AREAS

MAJOR PUBLIC

This category refers to parkland and significant open space lands held in public ownership. Included are local, State, and Federal parks.

MAJOR PRIVATE

This category includes parkland held in private ownership that may or may not be accessible to the general public. Golf courses and major privately

owned campground areas would be represented by this classification. Tourist commercial districts are not included.

MARINA

All marinas accommodating more than 200 boats are identified by a symbol for this category.

AREA SUPPORTING WATER-DEPENDENT RECREATION

This category refers to surfing, skin diving and SCUBA areas recognized as providing outstanding conditions for these activities.

Available Sources:

Local, State and Federal land use inventories; State Department of Parks and Recreation; U.S. Forest Service publications; Western Surfing Association.

SIGNIFICANT PUBLIC AND SEMI-PUBLIC OWNERSHIP

Significant public ownership includes large contiguous parcels by local, State, and Federal agencies. Semi-public ownership includes large contiguous parcels existing in an open space condition. Semi-public owners have either (1) a recognized responsibility to the public interest, such as public utilities, water districts, and universities; or (2) an established intent to serve the public interest through non-profit land-banking endeavors such as accomplished by the Nature Conservancy or the Catalina Open Space Easement. Each of these ownerships is identified by name on the Coastal Resources Map.

Available Sources:

County Assessor's books; local State and Federal land use inventories.

DEVELOPED AREAS

Land generally committed to urban-type uses, including residential, commercial, institutional, industrial, manufacturing, and military facilities. No consistent statewide guidelines were used for there designations by the Regional staffs for this Preliminary Plan.

Available Sources:

Local land use inventories; California Region Comprehensive Framework Study.

AREAS OF POTENTIAL HAZARD TO PUBLIC SAFETY

Included in this category are areas subject to the following potential dangers: tsunami, flood, landslide or other mass movement, high or severe seismic risk areas; and cliff retreat or shoreline erosion.

These dangers are aggregated to shown general areas of potential hazard. Where reliable sources differ as to the extent or severity of a particular type of hazard, the more conservative position has been adopted. The degree of potential risk has not been shown.

Available Sources:

Division of Mines and Geology; Corps of Engineers; U.S. Geological Survey; and local general plan Safety Elements.

PROPOSED COASTAL ZONE BOUNDARY

See description below.

Preliminary Plan Map

This map illustrates the application of Plan policies to geographic areas. Subregions are delineated and areas having deeper problems for which policy recommendations could not be completed by the deadline for this Preliminary Plan are indicated as needing further study. Natural or man-made areas of critical concern in the coastal zone have been identified as preservation areas. And some sites for future acquisition have been proposed.

The notes on this set of maps are interpretations or Regional Amplifications of Plan policies. Comments are directed towards identifying major coastal issues and where possible, indicate a direction or solution for resolving conflicts between Plan policies and current land use patterns. All notes have been prepared by regional planning staffs in conjunction with Regional Commissions but have not been formally adopted.

Descriptions of each of the factors mapped follows.

EXISTING COASTAL ZONE BOUNDARY

This line represents an interpretation of the Coastal Act's definition of coastal zone by each of the Regional Commissions.

PROPOSED COASTAL ZONE BOUNDARY

The proposed coastal zone boundary is based more nearly on the extent of major coastal zone resources (as shown on maps prepared by the Regional Commissions) than is the existing boundary. The proposed boundary thus does not coincide with the interim lines established by the Coastal Act.

SUBREGION BOUNDARY

For both descriptive and planning purposes, coastal Regions have been subdivided into subregions along natural geographic boundaries and distinct boundaries

separating different urban communities. Accompanying text that begins below, prepared by each Regional staff, describes major coastal planning issues for each subregion and often recommends appropriate resolutions.

SPECIAL STUDY AREA

This designation indicates areas where special studies are recommended to be undertaken or are being developed presently by the Coastal Commissions in cooperation with local agencies to solve difficult problems. The regional summaries generally describe the problems and indicate the kinds of studies required to address them.

Regional Summaries of Resources, Issues, and Plan Proposals

The following pages describe in summary form the critical resources; major plans, development pressures, and environmental problems (including economic and social concerns where appropriate); and major Plan proposals recommended by the staffs of the Regional Commissions. The discussions are organized by Region from north to south, each beginning with a Region summary followed by more detailed descriptions of smaller geographic units or "subregions." These subregions, depicted on the Preliminary Plan maps, have been defined for descriptive purposes only at this time.

North Coast

The North Coast Region, one-quarter of the California coastline, is composed of the three northernmost coastal counties in the State. This region is a sparsely populated area with the focus of population scattered along Highway 101 and Highway 1. The counties and their population as of 1970 are, from north to south, as follows: Del Norte, 14,600; Humboldt, 99,500; and Mendocino, 51,300. Unlike most other coastal counties which have reflected increasing population, the three northern counties have actually decreased between 1960 and 1970. Del Norte is among the smaller coastal counties in area while Humboldt and Mendocino are among the largest.

The rural character of the countryside with its ranches and dairy farms, the quaint and charming New England flavor of communities such as Ferndale and Mendocino, and the lack of large city congestion are part of the appeal of this region. The remoteness of the North Coast from any large population center is responsible for the ability to retain this appeal and also has allowed low- and moderate-income groups of the region to be able to enjoy this appeal and to have the additional benefits of a slower paced lifestyle.

The economy of the North Coast is based upon forest products, agriculture,

fisheries, and tourism. Timber products are the primary ingredients in the livelihood of the people of this region. Agriculture and fishing are additional but cannot replace timber as the basis for the North Coast economy. The recreational appeal of the region attracts an additional 40,000 to 50,000 visitors from across the nation; however, this influx of visitors is limited to the months of June to mid-September. This short tourist season is not only significant to the North Coast but it is a stimulus to the national recreational industry. Likewise the timber and fishing industries are not only important to this region and the State but are of national concern. The objectives of the Coastal Plan in Del Norte, Humboldt, and Mendocino Counties should be to maintain these present attractions as a scenic and natural resource area, to preserve agricultural lands, and to conserve natural areas without jeopardizing economic stability.

SUBREGION 1: DEL NORTE COUNTY

Del Norte County's coastline extends from the Oregon border south to Humboldt County. Of this $45\frac{1}{2}$ mile long coastline, 51 per cent is open to the public. Approximately 20 miles or 44 per cent of this shoreline is composed of rocks and rugged beaches. These rocky beach habitats provide primary wildlife areas; for example, four offshore rocks (Hunter Rocks, Prince Island, Castle Island, and False Klamath Rock) support 46 per cent of all the newts located on coastal rocks in the State. The remaining 25 miles of shoreline is composed of wave-swept sandy beaches.

The marshes and mudflats of Del Norte County are valuable in furnishing food and habitat areas for an assemblage of water-associated birds and mammals. These wetland areas are located at Lakes Earl and Talawa and at the mouths of the Smith and Klamath Rivers.

The coastline of Del Norte County is a valuable scenic and natural resource area; however, the adjacent coastal plain is the location of over three-quarters of the county's population and its primary activity area. Public ownership in the county, nearly 75 per cent of its total area, limits the activity area and also the tax base of the county.

SUBREGION 2: HUMBOLDT COUNTY

Humboldt County's 121.3 miles of coastline consists of 39.1 miles of rocky shores and 82.2 miles of sandy beaches. The rocky shoreline provides secluded habitats for seabirds and marine mammals. The sandy beaches of Humboldt County are unsuitable for swimming but are used for fishing, strolling, and clamming. Boating facilities at Trinidad, Humboldt Bay, and Shelter Cove provide launching sites for sport fishermen. The remote southern third of the county, between Centerville Beach and Shelter Cove, is infrequently used by visitors and consequently provides habitat areas that remain relatively undisturbed. Two major wetland areas, Humboldt Bay and the Eel River delta, are of statewide importance in their contribution to maintaining associated wetland wildlife populations. These and other coastal wetlands along with pasture lands and sheltered waters comprise the center for wintering waterfowl in California north of San Francisco Bay and are essential in maintaining Pacific Flyway waterfowl populations.

Over 34 per cent of the coastline of Humboldt County is owned by the public. Combined with private lands available to the public, this increases the percentage available to public use to over 65 per cent. Public parks along Humboldt coast

provide the beach visitor with the ruggedness of the King Range National Conservation Area to the quiet beauty of the Redwoods National Park.

Clustered around Humboldt Bay are the industrial, commercial, and population (50 per cent of Humboldt's 99,642) centers of the county. The bay in addition to its role as wildlife area provides waterborne transportation for Eureka industry and recreation.

SUBREGION 3: MENDOCINO COUNTY

Mendocino's coastline is dominated by rocky beaches and headlands--84 miles--and interspersed with 36 miles of sandy beaches. Of the 120 miles of shoreline, 10 per cent or 12.6 miles is open to the public; 11 of these miles are in existing State Parks. The Noyo, Ten Mile, Big, Albion, Navarro, Garcia, and Gualala Rivers, along with 19 other coastal streams, rivers, ponds, and creeks, provide salt and fresh water marshes, mudflats, and riparian habitats which support many forms of wildlife. The rugged terrain and the cold water and other characteristics which make the beaches unsuitable for swimming reduce the amount of human use expected and will probably keep it at a low level, offering a minimum threat to the wildlife resource.

The coastal shelf of Mendocino, one of the largest and least populated coastal counties, contains one-third of the county's 52,000-plus population. Numerous small communities and towns, such as Gualala, Mendocino, and Westport, reflect a New England flavor. These communities and the scenic and natural resources are the attraction of the Mendocino coast.

North Central Coast

The North Central Region covers 140 miles of coastline in Sonoma, Marin, and San Francisco Counties.

The northernmost county, Sonoma, has a rugged rocky coastline shared in roughly equal proportions by second home developments, public parks, and grazing cattle. Coastal problems center on the tremendous future commitment that has been made to second home subdivisions by county government, and how to keep the remaining coast physically and visually accessible to visitors.

Marin County's coast is mostly in public ownership except for a few coastal villages surrounded by parklands. Tomales Bay is an important feature in the Marin landscape, both as an estuarine area of environmental significance and as a reminder of that great geologic flaw that has so influenced the region's coastal landscape--the San Andreas Fault. In Marin the growth commitment issue is somewhat reversed in that development is being strictly limited at the local level. But the exclusionary effect upon citizens of the State is similar, because it is visitor-serving facilities catering to "outsiders"--even in parks--that come under the strongest opposition from local growth control advocates.

In San Francisco, the sand dunes that once made up the coastline were long ago covered over with homes so there is little natural coastline left, and access is hardly an issue when city sidewalks reach almost to the sea. Accommodating newcomers is an issue even in urban San Francisco, however. The

unwelcome newcomers here are the bland four-story apartments which are randomly replacing the small aging houses that represent San Francisco's last bastion of family living.

SUBREGION 1: NORTH SONOMA COAST

This subregion stretches 32 miles from the Gualala River (Mendocino county line) on the north to the Russian River Valley on the south. Redwood and pine forests cover the undulating ridgelines of the coastal mountains. In many places, grass-covered or partially forested terraces slope gently toward the ocean ending abruptly in a drop to a rugged sea-etched coast. In other places, the coastal mountains drop directly to sea and the coastal highway clings none too permanently to the slopes. The San Andreas Fault slices down the length of the region forming the Gualala River Valley; much of the area is geologically active and unstable. Even the level terrace lands are poorly drained and highly susceptible to erosion and soil slippage. However, ample rainfall (40 to 75 inches per year) creates a lush vegetative blanket over the area's fragile and hazardous geology. Forest and grasslands provide habitat for a rich variety of wildlife. Cattle and sheep range across the lightly forested land, and logging has become a sustained activity in areas of denser tree growth. The many tiny coves along the shoreline that once gave flimsy protection for the loading of lumber schooners are now frequented by sports divers and fishermen.

All land transportation between Jenner and the Navarro River (42 miles north of Gualala in the North Coast Region) is virtually confined to Highway 1, which cuts a sinuous, scenic, and precarious pathway along the ocean's edge. The great beauty of the natural setting and the marginal nature of the road system serving this subregion are the basis of this area's major issue. Heavy commitments have been made by Sonoma County to second home subdivisions to a point that makes extensive additions to the coastal road system seemingly inevitable.

Plan policies, however, place high value on retention of the present rural character of the coastal road system, and it is apparent that reconstruction of Highway 1 to more ample dimensions through this subregion would call for elaborate and expensive applications of road engineering skills. The environmental and aesthetic pricetags would be forbiddingly steep.

The extent of public commitment to second home development at the Sea Ranch, which takes up the northernmost 10 miles of coastline, is a subject of current litigation between the developer and the Coast Commission. At this time, it is unknown whether Sea Ranch has the legal right to create 5200 dwellings on its property (the developer's position) or whether it will be possible to limit the number of units to a fraction of this number. The Regional Commission is now considering the implications of four different options at Sea Ranch: (1) a Sea Ranch of 4000 dwelling (the developer's current plan); (2) a Sea Ranch of 2000 dwellings (approximately the number of lots already subdivided and sold); (3) a Sea Ranch limited to 800 dwellings (a number which could be sustained by the existing roads); and (4) a Sea Ranch limited only by dwindling market demand.

If the developer has a legal right to create 5200 units; then the public has one option to improve Highway 1 or to reconstruct the Skaggs Springs-Stewarts Point Road as a lateral connector to provide additional capacity for Sea Ranch-

bound traffic. Alternatively, it might be preferable to simply have the public purchase undeveloped lots at Sea Ranch, since the cost of lots, while high, will probably be less than the costs of road reconstruction. It might be that even 2000 lots at Sea Ranch would be too many and that public purchases will be recommended regardless of the rulings of the courts.

Since the Sea Ranch as now planned is an exclusionary enclave which would bar physical and visual access to the length of its coastline, the Plan calls for acquisition of coastal day-use areas at several points in presently unsubdivided portions of the subdivision (at Units 8, 34 and 36).

Except for several existing parks, much of the area's dramatic coastline is in private ownership and in use as grazing land. The Plan calls for practically all of the undeveloped land between Highway 1 and the shoreline from Sea Ranch to Jenner to be retained in open space. In total, this would amount to approximately 16 additional miles of coastline to be protected through public acquisition of development rights, scenic easements, or fee title. As funds become available, trails and day-use areas would be created along portions of the bluffs to create a band of coastal access and view protection. It is desirable, however, to maintain as much of this land in productive agricultural use as possible so it is recommended that, even with public purchase, agricultural activities would be continued.

At Stewarts Point, a number of buildings remain of a settlement which was once a "doghole" lumber port. It is proposed that this area be preserved as an historic park and restored either with private or state funds.

Salt Point State Park should be expanded in area and some 200 additional campsites built. The coastal terrace of the Seaview Highlands subdivision should be purchased and added to the park. The park at Stillwater Cove is also slated for expansion in three directions: west to Ocean Cove along the bluff; northward to include Stockhoff Creek Canyon; and southward along the coast to the Timber Cove subdivision.

About 214 lots at Timber Cove would be approved for development. This is all of the existing parcels except for those lots with septic tank problems which front on Timber Cove Creek (the subdivision's water source) and the lots in the Nineve Drive terrace section which would be acquired for public view protection and day-use access.

Plans to expand both the historic interpretive function at Fort Ross (and the area of the park) are endorsed as well as the concept of adding activities and displays that reflect the cultural history of California Indian settlements at that site. Care should be exercised, however, to make certain that contemporary reconstructions do not destroy sites of archaeological, historical, or religious value.

Russian Gulch would be acquired as a park and campground, along with an uplands area including several strategically located lots in the Muniz Ranches.

At Jenner, development is to be restricted to the present village area. No further division of open lands adjacent to the village should take place. Geological and septic tank constraints dictate that lot consolidations will be needed before any additional growth takes place, and that future population increases will be minimal.

Major campsite development and visitor-serving facilities are encouraged in the Duncan's Mills area, consistent in character and scale with this Victorian/western village. No substantial development or structures should be permitted within the Russian River floodplain, however. The Willow Creek area, just inland from the immediate Russian River shoreline, is an appropriate location for state campgrounds, but the fragile and unique fresh water marsh at the mouth of the creek and other special natural areas must be protected.

SUBREGION 2: SOUTH SONOMA COAST

The 15 miles of coast from the Russian River to the county boundary at the Estero Americano differ from those further north in several ways. The coastal ridge softens in its contours and the coastal terrace broadens. Except for scattered plantings of cypress and eucalyptus, the land is treeless and open. A very narrow band along the immediate shoreline has been developed as the Sonoma Coast State Beach. While much of the area inland remains as grazing land, there are interspersed patches of subdivisions, both developed and speculative. The settlement of Bodega Bay, with a permanent population of around 400, represents the greatest concentration of dwellings in this section of the coast.

While the land in this subregion is relatively barren, the seacoast is spectacularly attractive. The sea, cutting into coastal sandstone, has sculpted a shoreline that includes expanses of sandy beaches punctuated with low cliffs and offshore sea stacks.

At Bodega Bay is a sheltered harbor which is home port to 203 fishing boats and a temporary home to many migrating water birds. Bodega Head, a small peninsula jutting into the sea, is the site of the University of California's Bodega Marine Laboratory—testimony to the rich variety of habitats in the area.

Underlying the sandy dunes area which connects Bodega Head with the mainland is San Andreas Fault which also underlies the harbor. Also hidden under the sands and grasses around the harbor are the remains of a cluster of Indian villages.

The state parklands lining the subregion's beaches are intercut with small subdivisions. The Plan recommends acquisition of undeveloped parcels that lie in the important view corridor between Highway 1 and the ocean. Parcels to be acquired include those in the two small units of Pacific View Estates and visually prominent ones adjacent to Goat Rock State Park.

Parking for the state beaches is a problem that will require a detailed special study for solution. In the summer months, the length of the coastal roadway becomes lined with parked cars and campers, and every headland promontory is crowned with a similar collection of chromium and sheetmetal. Adequate parking should be provided east of Highway 1 (with safe pedestrian undercrossings) and roadside and blufftop parking be discontinued.

At the settlement on Salmon Creek, a severe septic system failure rate has been reported. While the Plan approves a buildout of the remaining several dozen lots in this settlement, further construction should be halted until the Regional Water Quality Control Board makes recommendations for a long-term

solution to this pollution problem. There are a number of environmental threats to the Salmon Creek watershed that can affect its value as a habitat and spawning stream—ranging from saltwater barrier construction at its mouth to logging at its source. At the upper reaches of the watershed there is a stand of 30 acres of virgin redwoods—perhaps the only remnant of the forest that once covered the Sonoma coast. This potentially important spawning habitat and natural area deserves special watershed-wide study and regulation.

At Bodega Bay the question is, "how much growth?" The county plan shows this small, picturesque fishing village growing from its present population of 400 to around 10,000, but the Coastal Plan would permit housing for only an additional 200 residents in the town area. Instead of extensive residential growth, an approximate doubling of the current level of commercial fishing and visitor-serving facilities would be more appropriate. The nearby Bodega Harbour Subdivision is to be limited to the 336 homesites that had been created before the Coastal Act took effect, plus a moderate level of additional growth (150 units), with preference in this additional development given to visitor-serving lodge facilities. At Bodega Harbour, as at the Sea Ranch, the Commission is in court against the developer who claims that Sonoma County had given all necessary approvals to 1,600 rather than 350 dwellings.

Other growth issues at Bodega Bay concern the need to improve existing facilities for the commercial fishing fleet that plies the waters beyond Bodega Head. While the Plan endorses construction of modern facilities at Spud Point, it would require that full consideration be given to reconstruction of existing marinas in the harbor as an alternative. The dredging of marshes, wetlands, and mud flats should be absolutely minimized in any expanded berthing facility.

It is now apparent that construction should never take place on many of the tidelands leases granted to Sonoma County in 1951 by the State Lands Commission; the amount of maintenance dredging in the Harbor could be reduced by abandoning the most southerly portion of the channel that serves these undeveloped industrially and commercially zoned properties.

The University of California Bodega Marine Laboratory should remain as a center for research, but should not be expanded into a residential campus. The laboratory property now blocks public access between public parklands to the north and south of the facility. A connecting trail should be established through the property, suitably designed and regulated to protect the natural resources of the site.

Because of the high probability that any new construction in the vicinity of Bodega Bay would disturb archeological sites, surveys would be required by the permanent coastal agency before any construction is authorized.

SUBREGION 3: TOMALES BAY

The San Andreas Fault has created a great sunken valley as it cuts into the California mainland near the northern boundary of Marin County. The resulting embayment, Tomales Bay, is a wetland with many unusual properties. The eons of slippage along the fault have resulted in the opposition of shorelines that are geologically from different places. The land on the east side of the fault is arid, open, and rolling, while the opposing shore is rocky, tree-covered, and angular. The bay seems a great hallway where the viewer is ever aware of

the sweep of the narrow bay and the peculiar contrast of the opposing shores. Beyond the entrance to Tomales Bay are two esteros, Americano and San Antonio, that are virtually inaccessible and pristine. At the entrance of the bay is the town of Dillon Beach and the Oceana Marin subdivision—both slipping imperceptibly downward toward the sea. Sheltered behind a row of dunes is a jumbled city of decrepit trailer homes populated on weekends by fishermen drawn from Sacramento, Stockton, and other valley cities.

Ranchers graze their livestock along the softly slumping hills of the east side of the bay and the shoreline is either open or cluttered by modest homes perched at the water's edge or poised over the bay on pilings. Reminders of historic settlements remain at Cypress Grove and Marshall. In 1913, the Army built a large hotel-like structure on the bay in an unsuccessful attempt to entice Marconi to locate his work on a transcontinental radio system here. The structure and surrounding lands now form the nucleus of the Synanon Foundation's "people ranch," the largest concentration of population on the east side of the bay.

The tree-covered west side of the bay, at Inverness and Inverness Park, has been a focus of real estate speculation since 1889. In spite of decades of promotional effort, the construction of homes has proceeded at a leisurely pace. There are now about 770 homes here. The village of Point Reyes Station, with a population of 400, lies at the end of the bay where shallow waters and primitive septic tank systems create persistent pollution problems.

The bay itself is a valuable natural resource. The University of the Pacific maintains a marine station at Dillon Beach and the Audubon Canyon Ranch has ambitiously acquired shoreline habitat areas for study and protection. For years the bay has been the site of mariculture activities and there are a number of small-scale oyster-growing operations in the bay's waters. The bay supports active commercial and sports fisheries. Hunters and birdwatchers share an interest in the waterfowl and shorebirds that frequent the bay.

Little growth is recommended in the several small villages near the coast: Bodega, Valley Ford, Fallon, and Tomales. Such development as does occur should be of small scale in keeping with the character of these settlements. The coastal zone boundary should be redrafted near Valley Ford to include the segment of Highway 1 that is presently excluded. Because of its environmental interest and richness, and because it is a center for research facilities, the entire Bodega Bay to Tomales Bay area should be managed as a marine resource area. Bodega Harbor, Bodega Bay, and Tomales Bay should be placed under a special management system that permits continued productive use of fisheries but establishes controls to protect marine resources. Some areas would be designated as special research zones and access would be controlled. The estuarine sanctuary program of the Federal Coastal Zone Management Act may well be appropriate for part of this area. Estero Americano and Estero de San Antonio should receive special protection. The shoreline areas should be accessible, but only to those members of the public willing to hike in from Bodega Bay or from Dillon Beach.

At Dillon Beach, infilling of already subdivided lots (250) would be permitted, but the undeveloped north unit of Oceana Marin subdivision should be maintained and rezoned as an agricultural area. Some existing lots may be unbuildable because of geologic instability; detailed soil investigations will be required before construction is permitted on lots with probable problems. There is a potential for expansion of limited visitor facilities in the vicinity of Dillon

Beach, but sanitation improvements will be needed before there is any expansion of the trailer encampment south of town.

There are a number of locations along Tomales Bay where boat launching areas and boat slips could be provided with minimal environmental effect. The treacherous entrance channel to the bay can trick even experienced local boaters, so before any expansion of boating on Tomales Bay is permitted the environmental effects of channel improvements should receive thorough study.

The long abandoned right-of-way of the North Pacific Coast Railroad along the east side of the bay should be utilized and developed as a biking and hiking trail. The plans of Audubon Canyon Ranch to create a nature study center at the old Cypress Grove resort would be quite compatible with this proposal, providing that portions of the property and facilities were open to the public. Properties between Highway 1 and the bay should remain minimally developed. In some cases public acquisition as open space may be appropriate while in others agricultural uses may be continued. No further construction of bayside homes on pilings or fill is to be allowed.

Expansion of the Synanon complex at Marconi Cove would be permitted providing that new construction is hidden from public view and natural resource constraints are respected.

The village of Point Reyes Station is the appropriate locus for moderate commercial visitor facilities related to the Golden Gate National Recreation Area (GGNRA). However, the expansion boundaries for the village set in the Marin Countywide Plan seem excessive and do not respect the "visual boundaries" of the settlement. The Regional Commission is currently considering alternate expansion boundaries. Also, the need for a sewage treatment facility to serve the town is evident; further development should be predicated on the correction of present problems.

Inverness and Inverness Park should be allowed to gradually increase in population, but there should be an immediate moratorium on development on lots of less than one acre or on steeply sloping lots (above 30% slope) where septic tank failures might be anticipated. The cumulative effect of continued reliance on septic tank systems in this area should be evaluated by the Regional Water Quality Control Board. Development on up to 350 additional lots would be permitted along with limited expansion of visitor-serving facilities inside the tracted area. Very little further lot splitting or subdivision of lands is appropriate. The management of Tomales Bay State Park should be integrated with the GGNRA, and some campsite development would be appropriate at the bayside park units.

SUBREGION 4: POINT REYES NATIONAL SEASHORE TO THE GOLDEN GATE

Surrounding the small villages of Olema, Bolinas, Stinson Beach, and Muir Beach are over 60,000 acres of Federal, State, and County parklands. The 55 miles of Marin County shoreline include beaches and sandspits, windswept headlands of coastal sage, redwood groves in sheltered canyons (including famed Muir Woods),

evergreen forests along the ridgelines, and coastal oak and grasses within the valleys. The ever-present San Andreas Fault has left its impression on the land, forming the Olema Valley and Bolinas Lagoon before disappearing into the sea.

A fierce surf pounds on the exposed western beaches of Point Reyes, but at Drake's Estero and at Limantour Spit the sea is gentle and the sand inviting. Grazing and dairy operations continue under long-term agreements with the National Park Service. Access is limited to the southern shoreline of the sea-shore to those who are hardy enough to hike or horseback in from the trailhead at Bear Valley (4.4 miles).

The tidepools of Duxbury Reef are an area of special interest, all too accessible to abuse by over-enthusiastic students of intertidal life. At Bolinas the beach is intensively used by surfers, fishermen, and equestrians as well as by clothed and unclothed sunbathers. Bolinas Lagoon, now a county park, is a rich wetland area, a feeding ground for migratory water fowl and shorebirds, and a sanctuary for a luxuriant collection of burrowing clams protected from human predation by the pollution of the lagoon with Bolinas and Stinson Beach sewage.

The Stinson Beach and Bolinas area has the sunniest, most fog-free climate of any spot in the North Central Region (apart from the Olema valley). The beaches have provided refuge to generations of Bay Area residents in search of warm sun and surf—a non-too-common combination in northern California.

The Marin headlands approaching the Golden Gate are dotted with the remnants of fortifications constructed over the years to defend San Francisco Bay. One of the very few advantages of the perfection of the intercontinental missile was the elimination of any need to further maintain this fortified coastline. The old fortifications and bunkers have now become the nucleus of the Golden Gate National Recreation Area (GGNRA), and nature is slowly recapturing the land scarred by years of military occupation.

The major problem in West Marin is how to accommodate (or discourage) visitors attracted to the massive parklands. Residents of the tiny islands of privately owned land left in the sea of parklands are worried that they will be overwhelmed by a tide of visitors and tacky commercial development. Even now, tourist traffic clogs local streets and parked cars spill into any available space on holiday weekends. Some feel that the Golden Gate National Recreation Area should be a place of wilderness and solitude and oppose any concept that would involve "development" within park boundaries.

On the other hand, it is apparent that this vast recreation area has a high use potential. Existing public recreational facilities and campgrounds in nearby parks are heavily used—to the point of abuse. The question is one of balance; how to provide for the needs of visitors without destroying either the value of the GGNRA or the character of coastal villages. The National Park Service, assisted by an official GGNRA Citizens Advisory Committee as well as other government agencies and citizens' organizations, is beginning work on a master plan for the use and development of the Point Reyes National Seashore and the Golden Gate National Recreation Area. Unfortunately, this master plan will not be completed within the coming year. Therefore, the Coastal Plan proposals should be seen as illustrative of the application of coastal policies to these federal parklands, subject to review upon the completion of the more detailed, comprehensive master plan.

The Coastal Plan suggests a strategy of balance for visitor facility development in West Marin. Lucas Valley Road should be developed and promoted as the prime access way to the northern portion of the park complex. Relatively high use visitor areas would continue to be focused at Limantour Spit, Drakes Beach, and the Olema Valley. Several hundred campsites and tent cabins should be developed in visually unobtrusive settings in the Olema Valley.

Proposed areas of limited access or restricted use include areas around Tennessee Cove, Slide Ranch, Double Point, and Tomales Point. Compatible agriculture within the park should be continued. A southern entrance to the park should be minimally improved at Palomarin; a supplementary trailhead should be established in the vicinity of the Five Brooks area.

At Bolinas, village expansion should be limited to the area identified in the community's plan and the growth rate regulated to around six residential units a year. This same rate should be applied to Stinson Beach—which would result in an additional 100 homes in each community by 1990. Direct application of growth management measures would be required to maintain this low rate of growth. Modestly scaled visitor serving facilities should be added to each community keeping pace with the increase in private residences. Preference in allocating development rights should be given to structures available for public use.

The pollution of Bolinas Lagoon should be corrected. Plans to correct the situation need to be implemented and it is apparent that some intervention may be required to break the present stalemate at Stinson Beach, which tolerates the pollution as a means of local growth control. Any treatment facility constructed, however, should be scaled in accord with growth management objectives.

While tidepool misuse is a problem at Duxbury Reef, it appears that the best strategy of protection is to post informational signs and do nothing to attract further visitors to the site. The Bolinas beaches are narrow, capable of little additional use, and should remain similarly unadvertised. Beach erosion and the encroachment of protective works to protect threatened homes is an issue that needs special investigation.

The usable area of Stinson Beach should be increased through purchase of dry sand areas and undeveloped dune parcels from the present state park boundary to the tip of the Seadrift Sandspit. Additional restrooms and parking areas should be constructed to better distribute visitors along the beach. Although no campsite development should take place at the expense of day-use facilities, some modest development might be appropriate at Stinson Beach State Park. A southern entrance to the park should be a long-range management objective.

The present State parklands at Stinson Beach, Mount Tamalpais, Muir Beach, and the Marin Headlands should be transferred to the Golden Gate National Recreation Area. Only Stinson Beach appears to have additional use potential. At Muir Beach there is potential for only the most modest expansion and a need to better locate existing facilities. (The buildout of the remaining 50 residential lots at Muir Beach and Seascape would be permitted).

While Tennessee Cove is a highly attractive spot, a dangerous surf, the fragile natural environment, and the uncluttered natural setting recommend it as a moderate-to low-use area. No private vehicle access or parking should be provided at the cove. The Fort Cronkhite area adjacent to Rodeo Lagoon could

tolerate relatively high levels of use and some of the existing military barracks and structures would be suitable for visitor-serving facilities and hotels. The existing campground at Kirby Cove should remain at about its present size.

There is an immediate need to provide trail connections between the existing trails systems on Mount Tamalpais to those within the Point Reyes National Seashore. Connections should also be established across the Marin Headlands to the Golden Gate Bridge. Given the moderate-to low-use potential of much of the shoreline of the Marin Headlands, these trails would provide the only oceanside access between activity centers at Fort Cronkhite, Muir Beach, Stinson Beach/Bolinas, and the Point Reyes beaches.

Transportation to West Marin is a problem since narrow, winding and often congested Highway 1 serves as the subregion's only north-south connecting link. Parking upon arrival at the coast is a further problem. Some relief of current congestion might be achieved by improvement and advertisement of the more northerly Lucas Valley Road lateral. Great reliance is also placed on the use of public transportation as a means of increasing access while holding private auto use down. Proposals for an internal transit system within the GGNRA offer the best means of establishing a transit alternative. Only minimal roadway improvements needed for safety or to accomodate buses and bike trails would be permitted on Highway 1 or on Panoramic Highway.

SUBREGION 5: SAN FRANCISCO

The open, wild coast seen in Marin and Sonoma has not existed in San Francisco for 80 years. Even then, the topography of these lands just south of the Golden Gate was strikingly different from the craggy, steepbluffed, rock-strewn coast of the rest of Northern California. Western San Francisco was mostly sand dunes. But the dunes are now completely developed covered over with pavement, row houses, and apartments. The only vestige of sand dunes that remains is at Fort Funston, in the far southwest corner of the city. The $8\frac{1}{2}$ miles of San Francisco shoreline from the Golden Gate to the southern limits of the city at Fort Funston is to become a part of the Golden Gate National Recreation Area.

Even though there is little natural landscape to protect from predatory bulldozers, the changes which are occurring in San Francisco's coastal neighborhoods are altering the city's social and physical pattern.

The problem is the loss of moderate-income family housing. An analysis of 1960 and 1970 census data, as well as building permit statistics, led SPEAK, a Sunset District community organization, to conclude: "Families are growing up and moving out of the area. Home ownership is dropping, rentals are increasing and the character of neighborhoods is changing from single-family homes to box-like apartments. Key districts within our community are being transferred from stable, low-density family-oriented neighborhoods into impersonal, transient, high-density areas".

As a preliminary proposal pending the outcome of the city's comprehensive Residential Zoning Study, the Coastal Plan proposes that no redevelopment to increased height or density be permitted in those blocks where fewer than one-third of the lots have been redeveloped to higher levels than the established

community character. Downzoning is indicated for many coastside blocks in order to protect and retain the family housing character of the outer Richmond and outer Sunset neighborhoods.

It is necessary to end the dreary repetition of maximum area/minimum design apartments in the coastal neighborhoods. San Francisco must establish a skillful design review process (including consultations with area residents) and a thoughtful revision of zoning standards that aims for excellence rather than enforces mediocrity.

Within the military portions of the GGNRA, non-essential military uses should be relocated to other military lands (such as nearby Hamilton AFB). The headquarters command at the Presidio and Letterman Hospital, of course, should remain permanently. Military structures such as those at Fort Winfield Scott should be used for urban recreational programs. At Fort Miley, the present expansion program of the Veterans Administration Hospital should mark the ultimate limits of development at this facility; the remainder of the fort's bunkers and headlands should be opened to public access. A trail and internal park transit route should be reestablished on the bluff below the fort.

At Seal Rock and Land's End, commercial development should be limited to the historic restaurant/hotel use at the Cliff House. Both because of the danger as well as to avoid disturbing the seals and sea lions which use Seal Rocks, public access to these nearshore rocks should be prohibited and access to cliff areas, some of which shelter fragile and rare plant communities, should be controlled.

Ocean Beach has been abused and ill-maintained for decades. While its potential is great (particularly on good days) it is presently a dirty, disagreeable place. Three things are essential to restore the high urban-beach potential of San Francisco's Pacific shore; better maintenance, better supervision, and the implementation of the city's Great Highway Improvement Plan to transform the existing freeway-like expanse of pavement into a four-lane, gently curving recreation road. The old Playland-at-the-Beach site, located on the outer edge of the Richmond District, provides the only location in the North Central Region appropriate for intense, urban, commercial recreational development.

Once largely surrounded by Water Department lands and golf courses, much of the open land around Lake Merced has, in recent years, been converted to development. Additional structural facilities should not be located on open lands around Lake Merced. Development should be limited to non-structural, water-oriented picnicking, fishing, boating, or trail uses. Facilities that exclude the general public (such as the police facilities and the target range) should be phased out or relocated.

San Francisco's existing sewage facilities are archaic. On rainy days, the bulk of San Francisco's sewage bypasses the treatment plants and is discharged, untreated, into the bay and the ocean. Several of these overflow outfalls are located along Ocean Beach. San Francisco's Waste Water Master Plan calls for the ultimate construction of a one-billion-gallon-per-day sewage treatment plant at the northwest corner of Lake Merced. Clearly, the situation is in need of improvement and a properly constructed deep-ocean outfall is preferable to a bay outfall. However, if such a facility is to be located near Lake Merced, extensive demonstration will be required to assure that no other location is as suitable, that its effect upon the quality of ocean waters will be neutral, that its structural design is adequate for this seismic area, that the plant

provides maximum opportunity for reclamation, and that open space recreation uses will be emphasized in its siting and design.

It is recommended that the Legislature modify the coastal zone boundary in San Francisco to follow Highway 1 through the city. The original boundary traverses Twin Peaks, in the center of the City, and includes many districts and neighborhoods which are distant or invisible from the coastline or which have very little access or relationship to "coastal" neighborhoods.

The Farallon Islands, located 28 miles west of the Golden Gate, are small, rugged, and barren. The present wildlife refuge status of the islands should be retained with no facilities to be constructed and no visitor program to be provided (other than the limited research efforts of the Point Reyes Bird Observatory).

Central Coast

The Central Coast Region extends 209 miles south of the densely populated hills of San Francisco to the rugged back-country of Big Sur. The fertile Salinas and Pajaro Valleys form the region's heartland, and their produce helps to make agriculture the basis of the regional economy. Tourism, centering on the cities of Santa Cruz and the Monterey Peninsula but relying on the region's wide beaches and spectacular natural beauty for support, also plays a major role. Attractions such as Point Lobos, Carmel Mission, Pebble Beach, Cannery Row, the Santa Cruz Boardwalk, and Steamer Lane are known far beyond the region's borders.

From the rugged coast of northern San Mateo County, the region passes south through the fertile Half Moon Bay coastal plain to the rolling hills and terraces of the Ano Nuevo Coast. The terrace widens at Santa Cruz, and the Santa Cruz Mountains form a backdrop for the Pajaro Valley and Watsonville. As the Santa Cruz Mountains march southeast to become the Gabilan Range, the broad Salinas Valley dominates the coast. Between the Pajaro and Salinas, an extensive slough system drains toward Monterey Bay, with Moss Landing at its head. Then high dunes protect the shoreline for many miles, before giving way to the plains of Monterey. Dominated by the Santa Lucia Mountains, the Monterey Peninsula juts out into the Bay, Carmel perches on the hillside just south overlooking Carmel Bay. South of Point Lobos the coast is again rugged, until the signs read "San Luis Obispo County."

SUBREGION 1: SAN FRANCISCO COUNTY LINE TO POINT SAN PEDRO

This coastal subregion, dominated by the suburban cities of Daly City and Pacifica, combines high accessibility to population with severe development hazards and important recreation opportunities. Daly City, straddling the San Andreas Fault and rolling terrain which drops off 400 feet at the edge of the coastal bluff, is almost totally developed. Pacifica, which strings together several communities nestled in the coastal valleys, anticipates a 50 per cent increase in population (to 90,000) by 1990. Much of the remaining open land in this subregion is on brush-covered hillsides; this feature has been identified by the Coastal Plan as a significant scenic resource.

Both Daly City and Pacifica contain major coastal recreation attractions. Thornton Beach State Park provides the only public access point to the wide beaches below Daly City's cliffs. The beach is the major attraction, but remains of the old Coast Highway, 150 feet above the beach, offer a spectacular hiking experience. If this route is safe, it would be an ideal location for the coastal trail recommended in the Plan. Additional access to the beach should be sought, since heavy use clusters near the Thornton Beach parking lot; two possibilities are Avalon Canyon (where a park is proposed) and the San Andreas Fault trace (now a solid waste disposal site). Pacifica's beaches and new fishing pier are also heavily used; the need for more convenient access, parking facilities and aesthetic improvement of the beachfront (all recognized by local and Coastal plans) may conflict with maintenance of special coastal neighborhoods (West Sharp Park) or with the development of coastal commercial facilities (Rockaway Beach).

Development of the Pacifica hillsides will be a major subregional plan issue. Local planned-development zoning and proposals for increased access promise to restrict buildable areas to lesser slopes, but have not yet successfully overcome concerns expressed by local residents and the Coastal Plan for potential erosion, public hazards, loss of significant open space, and impact of population. Coastal Plan policies should be translated into operable hillside development standards to meet these concerns.

SUBREGION 2: POINT SAN PEDRO TO TUNITAS BEACH

The Midcoast side of San Mateo County lies in the shadow of the Coast Range, tied to San Francisco by the precipitous Devil's Slide highway and to the populous Bayside by the winding Highway 92. Much of the fertile coastal terrace was subdivided after the 1906 earthquake, but little developed. The historic agricultural center of Half Moon Bay, now a city of 5,500, projects growth to at least 28,000. Encouraged by a new sewage treatment plant, the large number of existing lots and an aggressive developer, the city has overseen the conversion of agricultural land into residential subdivisions. Four unincorporated communities (Miramar, Princeton-El Granada, Moss Beach, Montara), separated by agricultural lands, contain 7,000 people, and are building up rapidly on existing lots.

The Half Moon Bay area supports a strong floriculture industry, both field- and greenhouse-based, some vegetables, and seasonal specialty crops.

State beaches at Montara and Half Moon Bay, a harbor at Pillar Point, and the tide pools of Moss Beach (Fitzgerald Marine Reserve) attract many day-visitors. Planned State and county purchases would make the public shoreline virtually continuous. Development of expanded beach facilities and a coastal trail called for by Plan policies will thus require little acquisition. Protection of agriculture, on the other hand, may call for policy refinements to deal with greenhouse practices, some redevelopment of subdivided but undeveloped agricultural lands, and policy refinements to deal with the existing checkerboard development pattern.

Special Study Area—Half Moon Bay: Transportation, sewer and water services, and the basic community infrastructure are the keys to development in Half Moon Bay. Further study will focus on these public services, establishing key decision points, levels of development, and alternative development patterns which are

consistent with and implement the Coastal Plan. City, county, harbor district, sanitary district, and Westinghouse/Half Moon Bay properties participation will be crucial to this effort.

SUBREGION 3: TUNITAS BEACH TO MAJORS CREEK

The rural coastline from Half Moon Bay to the northern fringe of Santa Cruz at Majors Creek contains a scenic stretch of Highway 1, gently rolling grazing lands, productive agricultural benchlands, commercial timber resources, several well-used beaches, and a major wetland at Pescadero. The settlements of Davenport and Pescadero are small but historic, and are designated as special coastal communities by the Plan. Año Nuevo Island, at roughly the center of the subregion, is a valuable wildlife habitat and forms a small part of the vast Big Basin-Año Nuevo State Park.

The maintenance of open space and commercial agriculture and provision of additional recreational beach access compatible with natural habitats are important Coastal Plan policies for this subregion.

The beaches in this subregion vary greatly in size and potential. Most beaches in San Mateo County are part of the State Park system although no permanent parking, restroom or camping facilities have been developed. Miramontes Point, Franklin Point (magnificent beach-dunes area), and Pigeon Point/Bolsa Point area beaches are the major beaches remaining in private ownership. Most northern Santa Cruz beaches are privately owned with no facilities. Where public use exists, access often crosses agricultural lands, and vandalism is common. The subregional plan will attempt to provide increased levels of access and greater protection for agriculture. Because the coastline of this subregion is irregular, with many small beaches, steep cliffs, and a hazardous tidal area, application of the policies establishing a coastal trail and a continuous band of public shoreline will require special attention.

Both Davenport and Pescadero would be affected by application of policies which would concentrate development in existing towns. Neither has "excess public service capacity" but might provide the least-impact locations for new visitor-serving facilities. A proposed nuclear power plant north of Davenport might be incompatible with increased development. Major changes in the limited land-related economic bases of the towns would have significant impacts on use of surrounding areas.

SUBREGION 4: MAJORS CREEK TO LA SELVA BEACH

The urban area of northern Monterey Bay occupies terraces and valleys between the Santa Cruz Mountains and eroding coastal bluffs. This subregion contains three cities (Santa Cruz, Capitola, Scotts Valley) and several unincorporated suburbs. Settled originally as agricultural and timber-processing centers and summer-home communities, the Santa Cruz area communities now serve as a major recreational and retirement location for inland residents.

Special Study Area—North Coast: Northwest of Santa Cruz, the coastal benchlands and creek valleys produce about 90 per cent of the nation's brussels sprouts, as well as artichokes and other crops. The uplands support grazing and commercial

timber. The area southeast of Majors Creek has been designated by the City of Santa Cruz for urban expansion, but recent and proposed State acquisitions (Wilder Ranch, Terrace Point, Natural Bridges additions) preempt urban development over much of the area. State Park and University of California plans include campgrounds, beach access, and a marine research station. The level of access needed, environmental safeguards for development, and protective measures for valuable coastal agriculture, archaeological resources, and impacted urban neighborhoods will be investigated by a special study.

The urbanized area between Natural Bridges and New Brighton Beach State Parks contains the bulk of recreational facilities in the subregion as well as several significant coastal open spaces (e.g., Lighthouse Field, Yacht Harbor uplands) and special coastal neighborhoods (e.g., Beach Hill, Capitola Village) designations in the Coastal Plan. The last amusement park on the California coast, safe beaches, and two fishing wharves draw millions of visitors each summer. South of Capitola suburban development predominates, and State Beaches are interspersed with exclusive homes and beach cottages below the coastal bluffs. Important wetland habitats remain despite urbanization: the San Lorenzo River (an important anadromous fish stream), Younger, Schwan, Corcoran, and Moran Lagoons (bird habitats), and ponds near La Selva Beach (a home of the endangered Santa Cruz salamander). Preserving these areas and restoring, where possible, degraded areas (such as Neary Lagoon, Soquel Creek, Arana Gulch) is an important Coastal Plan policy, and will be subject to subregional investigation.

To encourage recreational use with minimum adverse impact, application of policies encouraging coastal trail development, continuous public beach management, intown parking and transit to the beaches will be the focus of the subregional plan. Policies encouraging orderly development, coastal-dependent uses and protection of agricultural lands will also be important in view of projected area growth.

Special Study Area—Santa Cruz Harbor: In the Harbor area, for Seabright Avenue in Santa Cruz to 17th Avenue in Live Oak, and south of Capitola Road, are focused issues of protecting residential neighborhoods, maximizing access to coastal recreation, protecting remaining open lands and wildlife habitats, and concentrating urban growth. With the assistance of local residents, city, county, and port district, this study will attempt to improve regional use of the harbor facility, as well as to determine appropriate land uses, access patterns, and recreational/commercial balance of harbor use.

SUBREGION 5: LA SELVA BEACH TO SALINAS RIVER

This predominantly rural subregion stretches from the edge of the Santa Cruz urbanized area to the Salinas River in Monterey County. It contains the Pajaro River Valley and watershed, and the four slough drainages that make up the Elkhorn Slough System.

The Pajaro Valley, covering 120 square miles, is one of the richest agricultural regions in California. The moderate coastal climate, fertile soils, intensiveness of cultivation, improved fertilizers and technology, and the adoption of multiple cropping methods support a wide variety of food crops and return a high income per acre.

The urban center of the Pajaro Valley is Watsonville (pop. 17,000). Its economy is based on food production and processing; average family income is \$8,900.

Two unincorporated communities extend north and south of Watsonville: Freedom in Santa Cruz County and Pajaro in Monterey County. Continuation of these communities' rapid growth would involve the loss of valuable agricultural lands designated for protection under county and Coastal Plans.

Elkhorn Slough, one of the largest and most important estuaries and wetland habitats in California lies between the Pajaro and Salinas valleys. It is threatened by locally planned expansion of existing industrial and harbor developments, and by residential development of the critical watershed. Location of the largest fossil fuel power plant in California at the mouth of Elkhorn Slough, the potential of a deepwater tanker terminal offshore, and a proposed freeway extension from the Pajaro River to Castroville have raised major issues of oil spillage, air quality protection, and wetland preservation. Much of the coastline is in public ownership, but inadequate public access and a shortage of support facilities hamper recreational use. Second-home development of existing parcels on the oceanfront south of La Selva Beach and the recent completion of the Highway 1 freeway from northern Santa Cruz County to the Pajaro Valley could accelerate development pressures on agricultural and potential recreational lands.

Plan policies call for concentrating development in existing urban areas, such as Watsonville, Pajaro, Castroville, and Moss Landing rather than allowing continued conversion of agricultural land. The agricultural lands of the Pajaro Valley should be preserved; agricultural zoning and tax program changes could help greatly. Expansion of Moss Landing industrial and harbor facilities to meet new or existing demands, and new recreational and residential concentration will depend primarily on protection of the wetland and agricultural resources and provision of sewage treatment facilities.

Special Study Area—Elkhorn Slough System: Although the major part of Elkhorn Slough is in public ownership, neither the critical watershed nor the wetland resource itself is adequately protected. This study will assess the effects of continued residential development in the critical watershed of the entire slough system, and priorities for type and intensity of development in areas affecting the sloughs will be established. Watershed management and acquisition programs must be developed to properly manage Elkhorn Slough as an estuarine sanctuary and wildlife refuge, as recommended in the Coastal Plan. Monterey County, the Department of Fish and Game, and the Moss Landing Harbor District, as well as local residents and industries, will participate in identifying other areas of concern, including wetland restoration and recreational facilities.

SUBREGION 6: SALINAS RIVER TO MALPASO CREEK

Centered on Monterey and Carmel Bays, this subregion contains six cities and a growing military presence and tourist industry. It has resident population of about 100,000. From the Victorian homes of Pacific Grove to the Ventana Wilderness in the Carmel River watershed, the Peninsula offers a wide variety of scenic and recreational attractions.

Some of the Peninsula's attractions are natural features that would be protected under Coastal Plan policies: Point Lobos State Reserve, the pines and cypresses of Del Monte Forest, the white sand beaches of Carmel and Asilomar, the high dunes from the Salinas River to Monterey. Agricultural and grazing

lands of the Salinas and Carmel Valleys are recommended for preservation although both areas are close to expanding population centers. Indian occupation sites, Spanish and Mexican-era adobes, and representative buildings from American historical periods can be found in close proximity here, and should be integrated into the Monterey State Historic Park. The subregional plan will also identify opportunities to restore and enhance natural and manmade resources: dune habitats (Asilomar and Marina), wetlands (Canyon Del Rey), plant communities (17 Mile Drive), and historic sites (Royal Presidio of Monterey).

Growth potential, from an influx of personnel to Fort Ord, expanding conventional and tourist-commercial facilities, and new subdivisions in Del Monte Forest must be balanced against the limited water supply and protection of remaining natural areas and special urban communities. Salinas and Carmel Valley aquifers have been degraded by overuse, and restoration of water quality underground and water flow in the channels could have many benefits. A management plan for the Carmel Valley watershed will be one major concern of the subregional plan.

Implementation of Coastal Plan policies establishing continuous public management of the shoreline and a coastal trail system will require special attention in the Fort Ord-Sand City area, Pebble Beach, and south of Pt. Lobos. State acquisition of oceanfront meadows is underway, and will preserve a beautiful landscape from Carmel Point to Pt. Lobos. Another important recreation policy will seek to improve access to excellent diving areas such as Cannery Row and Carmel Bay in a manner consistent with resource protection.

Special Study Area--Marina Dunes: This study area is literally made of sand. Cattle, begonias, rare dune plants, vernal ponds, commercial sand mines, Army rifle ranges, three sewage treatment plants, a hotel, a freeway, and residential developments share the sandy environment. Appropriate levels of residential and commercial development, public access and recreational use, and wastewater treatment will be sought. The study will involve residents, local jurisdictions, and the U.S. Army in joint efforts to plan for the housing needs of Fort Ord, orderly community growth and concentration of development, effective management of water resources, avoidance of geologic hazards and protection of the massive dunes and other natural features in the study area. Recommendations for protection of the scenic bay frontage, and for potential restoration of bay views from the freeway will be made.

SUBREGION 7: MALPASO CREEK TO SAN LUIS OBISPO COUNTY LINE

The scenic Big Sur area is world-famous for its rugged beauty. Highway 1 from Carmel to San Simeon is a recreational area of national significance, with an estimated annual visitation of over a million persons. Existing conventional and wilderness camping facilities are used to capacity, and thousands of visitors are turned away every year.

Grazing remains an important land use, and is a primary factor in the maintenance of vast scenic landscapes. Access to the shoreline is limited to a very few locations; there is no publicly owned access north of the Big Sur River. Thus, the most popular attraction is the recreational motoring experience, enhanced by brief stops at scenic vistas, restaurants, and craft galleries along the highway.

The U.S. Forest Service manages much of the back country, part of which is protected as the Ventana Wilderness. Between the ocean and Los Padres National

Forest, the prime scenic corridor and day-use area of Highway 1, development conflicts are most acute. Although the existing Monterey County Coast Master Plan calls for the maintenance of scenic quality through "low-density" residential zoning, its 2 $\frac{1}{2}$ - to 10-acre minimums could permit as many as 10,000 residences to be built within a 100-square mile coastal watershed area.

The major constraint on future development is the capacity of Highway 1. Expansion of the road would be very costly and cause severe environmental impacts. Peak weekend traffic is already congested, causing competition between residential and recreational users. Because of inadequate public facilities, the lack of a public information center, and no management agency with the ability to control visitor impact, the recreational promise of the Big Sur coast is unfulfilled; problems of trespass, litter, vandalism, and overuse often go unchecked. Disastrous forest fires and mud slides in 1970 and 1972 underline the need for improved, unified resource protection. Nevertheless, because of outstanding scenic qualities, unspoiled beaches, old-growth redwood forests, and central location within a few hours drive of both the State's major population centers, the Big Sur coast represents one of the nation's best remaining preservation opportunities.

Special Study Area—Carmel River to Cambria: A closed system, the 90-mile stretch of Highway 1 along the Big Sur Coast must, by tradition, use, and policy of the Coastal Plan, serve several major purposes. A capacity budget for recreational and residential use and preservation measures for the scenic landscape will be important parts of the study. Coordination between the U.S. Forest Service, Monterey and San Luis Obispo Counties, the State of California, and Big Sur property owners will be essential.

The study will consider the application of Plan policies that could (1) improve service facilities within existing communities such as Big Sur Village, Lucia, Gorda, Ragged Point, and San Simeon Acres; (2) create alternative development patterns, particularly the clustering of permitted uses outside the viewshed; (3) reduce ultimate residential buildup through substantial acquisitions of land (or development rights) by State or Federal agencies; (4) initiate management actions, such as parking restrictions, to improve the quality of the recreational experience while protecting sensitive areas from overuse; (5) provide Yosemite-style public transportation, the use of which could be encouraged through a modest toll on private recreational vehicles; and (6) convert the existing highway to a Big Sur State Parkway in order to provide a practical means of controlling automobile access, providing visitor information, improving fire protection, and fund acquisitions and improvements.

SUBREGION 8: STATE TIDELANDS OF CENTRAL COAST REGION

The Central Coast Region encompasses approximately 600 square miles of offshore waters under State jurisdiction. The narrow continental shelf is penetrated by several submarine canyons, including the mile-deep Monterey Canyon off Moss Landing. Sheltered waters are rare outside the 25-mile-wide Monterey Bay; of four harbors in the region, two were dredged from wetlands and two are protected by large breakwaters. Elkhorn Slough, whose mouth forms Moss Landing Harbor, is a highly productive marine habitat and home of two endangered bird species.

Many important marine biological communities thrive here: the California sea otter, once nearly extinct, now ranges north of its official refuge well into

Monterey Bay; the northern seal breeds on Año Nuevo Island within a State reserve; regulations protect the numerous offshore rocks for sea lions and seals that "haul out" and birds that breed there. Valuable kelp beds support fish, invertebrates, and otters. Rich tide pools are located along much of the rocky shoreline; outstanding examples at Point Lobos and Moss Beach are preserved and provide recreational and educational opportunities.

Commercial use of marine resources is an important component of the regional economy and includes kelp harvesting, mariculture, commercial fishing, and seawater magnesium extraction. The Coastal Plan supports coastal-dependent activities such as these, and requires locations and levels of extraction that have minimal impact on biologic systems, scenic and recreational resources. Popular recreational uses of the coastal waters include diving in Carmel Bay, surfing at Steamer Lane, and sailing on Monterey Bay. Swimming (in warm waters at Santa Cruz), surfing and diving at many other locations, and fishing off piers, breakwaters, and boats are also attractive features of this subregion. Encouragement of recreational use which does not harm the environment is an important policy of the Plan; locating areas for recreational boating expansion and access and onshore facilities (restrooms) for surfers and divers will be important concerns of the subregional planning effort.

Protection and improvement of water quality are vital to all uses of coastal waters, and Coastal Plan policies deal with agricultural, toxic, thermal, sewage, and other discharges. Nearshore and poorly treated sewage discharges (as at Pillar Point, Soquel Point, and Point Pinos) pose severe aesthetic and biologic problems, and must be phased out. Scientific research in marine biology and oceanography, as conducted by Hopkins Marine Station, U.C.-Santa Cruz, Moss Landing Marine Labs, U.S. Navy Postgraduate School, and the California Department of Fish and Game at Granite Canyon, is strongly supported by the Plan. The data provided by these studies will be especially valuable for the establishment of effective resource management strategies.

Special Study Area—Monterey Bay: The bay's currents, marine invertebrates, sand-supply systems and mineral resources are the subject of much study. Encouraging the development of information, this special study will attempt to set policy guidelines for particular problem areas: open-water sewage discharges from local or regional sources, expansion or restriction of the sea otter habitat, assessment of harbor expansion needs on a baywide basis, development of new port facilities for PG&E, increasing recreational access to special underwater areas, and establishment of scenic protection measures for the highly visible bay shoreline.

South Central Coast

The South Central Coast Region extends some 250 miles from San Luis Obispo County to Ventura County. The Region's diversity is seen in a dramatically changing landscape of alternating steeply sloping mountain ranges to broad alluvial plains and rolling foothills. In some parts of the Region it is still possible to see an uninterrupted view of ocean, beach, bluff, grassy terrace, and hillside from one place, or to move through such landscape for many miles. Attractive coastal communities enhance the experience of the natural landscape of this Region by providing necessary services and rich cultural values. But these natural and

manmade coastal resources are in danger, as elsewhere in the coastal zone, of being lost to development. The continued existence of clean water and air, of areas rich in marine life and wildlife, offshore reefs and nesting sites, unusual plant communities, rocky and sandy beaches, and sand dunes that have not been altered by development is an asset to the entire State as well as the three counties of San Luis Obispo, Santa Barbara, and Ventura.

SUBREGION 1: SAN SIMEON-CAMBRIA

This is the physical transition between Big Sur and the oak woodland hillsides, terraces, and bluffs typical of San Luis Obispo County. From Ragged Point south, the coastal terrace widens, the bluffs become lower, and the hills are softer, covered with grass and oaks instead of brush. Travelers who have been on 45 miles of winding road are greeted by the flashing 50-foot signs of San Simeon Acres, motels, restaurants, and gas stations. South of San Simeon the coastal highway goes through Cambria, the remnants of the Cambria Pine forest, and continues south behind the first row of hills, past grassy hillsides punctuated by clumps of trees and a few weathered barns. At the southern edge of the subregion the highway emerges again at the mouth of a small creek and runs east and south along the inland edge of an open terrace, from which it is possible to see the entire community of Cayucos lying ahead across the water, and on a clear day, Morro Rock.

The open character of this section of coastline is recognized by the Coastal Plan and in county zoning and open space plans, but not in adopted general plans which would allow a community of 70,000 on the Hearst Ranch. Current agricultural uses fit into the aesthetic character of the region. Public comments from citizens of Cambria refer to the streams and hillsides; they worry about the continued existence of the pine forest, and about loss of views from homes, as increasingly large houses are built on the shoreline. Local realtors have several hundred letters from owners of 25-foot lots (Cambria was subdivided in the 1920s, but only a third of the lots have been built) saying they have dreamed of building for years but cannot afford adjacent lots. Certain lots on steep hillsides that now form the wooded back drop of the town, in stream beds, or would be unbuildable if trees are to be saved; others are on the bluffs and, in the long run, will require retaining walls and riprap on the beaches.

Small anadromous fish streams and numerous tiny marshes, canyons rich in biological abundance, and small but frequent and varied habitats for land species are common and important natural resources. This subregion provides grazing for beef cattle with early calves. Offshore are habitats for abalone, lobsters, and other delicate nearshore species and their predators, including the sea otter. Offshore kelp beds sustain fisheries and reflect the relatively undisturbed and delicate marine environment of the subregion as well as the absence of outfalls. Public comment in the subregion has strongly supported urban limit lines, preservation of agricultural uses, protection of the existing high water quality of the ocean and streams, restrictions on gravel mining, and prohibition of electrical generating plants.

San Simeon State Park attracted 1.2 million visitors during 1974, 7,600 of whom stayed overnight at the State Beach. The beaches of the subregion are cold and rocky and used for walking, photography, and fishing. Highway turnouts and State Parks currently provide over 300 day-use spaces, which are used to capacity during the warmer months. Some bluff-front lots in Cambria are State-owned, providing small parks with wild flowers and natural bluffs. South of Cambria the only coastal

access and view of an untouched coastal terrace are provided by the Air Force Base parking lot. Second homes and retirement homes provide limited access but they do not conflict with beach walks.

SUBREGION 2: ESTERO-MORRO BAY

From Point Estero to Point Buchon the central California coastline curves inland to meet two stream valleys that join in Morro Bay, one of the largest estuaries on the coast. South of the Bay, high sand dunes were trapped in Pleistocene times by the natural groin at Point Buchon and are known now as the Baywood Park-Los Osos area. The Irish Hills form a barrier between the northern county coast and the subregions to the south. Three distinct coastal communities are found along the shore. Cayucos, formerly an agricultural village, is still small enough to encompass entirely on foot, or to see from a distance. Morro Bay is a tourist town that was built up around fishing. Los Osos-Baywood Park, originally an 1890s subdivision sold to midwesterners by magazine advertisements in the 1920s, has experienced a recent building boom. Highway 1 goes southeast from Point Estero along open agricultural coastal terraces, bends around Cayucos, and then runs parallel to Atascadero Beach. At Morro Bay it turns inland and follows the line of the Morros through agricultural and institutional land to the City of San Luis Obispo. To stay on the coastline, a traveler drives through the City of Morro Bay, along the edge of Morro Bay through the State Park, and follows suburban roads through Baywood-Los Osos. Montana de Oro State Park occupies 7,000 acres at the end of public coastal roads south of Los Osos near Point Buchon.

The most obvious natural resource is the full, rich, and complex system of upland streams and valleys, marsh, bay and nearshore reefs that provide nesting and feeding for thousands of fish and migratory birds and marine mammals.

Pelagic birds fish in Estero Bay and migratory geese land and herons nest in Morro Bay. Shore birds, hawks, and falcons nest near the Bay and prey on rodents and other birds. The richness of birdlife is an indication of the quantity of food available in the marshes and offshore in Estero Bay. People take advantage of the clams and oysters in the Bay mud and of the variety and number of fish in Morro and Estero Bays that feed offshore on plankton or other fish. Over 300 fishing boats of various sizes operate out of Morro Bay. Landings of fish caught in nearshore areas in Morro Bay in 1973 were worth \$1.2 million.

Other natural resources include agricultural land, excellent quality groundwater, rare dune plants, and unique combinations of scrub and chaparral that shelter the remaining population of the local endangered species, the kangaroo rat.

Existing coastal communities provide, among other things, relatively smog-free retirement spots with small populations and distinct boundaries. Such communities are small enough to have what respondents to a Regional Commission questionnaire called a "small town atmosphere"—a slow pace and enough information about small events to make it a safe place to be sick and old (in a way Los Angeles is not) and an economical place in which to retire. In these communities a few feet of height on a house, a particular tree, a view of a small promontory, or other unmappable features of the physical environment matter to a great many people. At the same time community residents expect government to be close, informal, and flexible, and not to unnecessarily regulate what a person may do with privately-owned land.

In recent years abalone has ceased to be a viable commercial fishery in the sub-region; in addition, the increasing siltation of the estuary and the inexplicable deaths of oysters have increased concern for the vulnerability of this subregion's natural resource system. Within the next year major decisions will be made on converting existing small oil terminals to (1) a major supertanker facility to handle immediately 520,000 bbls/day, with an eventual capacity of 1 million bbls; and (2) a major fuel oil terminal for the power plant. The industrialization of the shoreline and the ocean in the area could result in major changes in ambient air quality, water pollution levels, and numbers and kinds of species found.

SUBREGION 3: SAN LUIS BAY/PISMO DUNES

From Port San Luis southward extends a string of small towns—Avila Beach, Pismo Beach, Grover City and Oceano—that have distinct social and geographic indentities. Highway 101 emerges from San Luis Obispo valley at Pismo Beach only to leave the coastline south of town. The presence of this access and sandy beaches has made Avila and Pismo Beach "the beach" for San Luis Obispo County and for communities as far east as Fresno, as well as northern Santa Barbara County.

San Luis Obispo Creek has had its estuary periodically blocked and dredged, but south of Pismo Beach a pattern of agricultural plains, small creeks, wetlands, and sand dunes begins that continues through the Nipomo dunes and into Santa Barbara County. The Pismo clam is a valuable and increasingly scarce food resource. At Pirates Cove and Pismo Beach, there are 40- to 80-foot bluffs.

Avila is a small commercial fishing village. All the coastal communities provide inexpensive homes and overnight accommodations. Pismo Beach retains some of the original home-and-small town feeling. Pismo Beach, Oceano, and Grover City provide together the only widely used vehicular beach in the State.

At Pirates Cove beach, one drives out a county road, parks on the bluff top, and scrambles down precipitous narrow paths to the beach. In parts of Shell Beach, tiny paths cross subdivided lots along the brink of the bluffs. The Dinosaur Caves are surrounded by foot paths. Automobiles, dune buggies, and campers drive south from Grover City to enter the dunes. In all cases, access is uncontrolled, primitive, great fun, unsafe, and possibly damaging to the land, vegetation, and animals. Construction of houses and motels, the conversion of the dunes portion of Pismo State Park, and more wear and tear caused by the increase in the numbers of visitors will restrict the form and perhaps the amount of access over the next few years.

A lightly used harbor at Port San Luis, little motels, small houses, an amusement park, and the State Park—provide the physical basis for access by people of a wide range of incomes.

Between Pismo and Nipomo Dunes are 15 miles of sandy beach and dune coastline essentially dedicated to recreation and limited industrial use. The tall and dramatic dunes are singled out in many reports for their statewide and even national interest and unique vegetation. Historically, the beach south of Pismo has been used for camping and clamming. The advent of off-road vehicles and the increase in the popularity of recreational vehicles over the last 10 years heightened conflicts between preservation and recreational use. State ownership of some of the dunes has brought use fees and restrictions on camping, reducing the numbers of sites available.

Behind the dunes, sources of freshwater marshes remain relatively untouched. While they are listed for preservation in every official conservation document, proposals under discussion for this area include increased vehicular access to the Dune Lakes and increased development around them.

Other resources of the subregion include prime agricultural land, stabilized dunes planted with eucalyptus trees, and grazing land. In this subregion, Highway 1 is winding and rural on Nipomo Mesa; plans to straighten it are under consideration.

SUBREGION 4: NORTH SANTA BARBARA COUNTY

The northern part of Santa Barbara County is physiographically part of San Luis Obispo County. Dune complexes continue south to the natural groin at Point Arguello. Rolling hills and a coastal terrace and bluffs continue east of Point Conception to the Santa Barbara area. Public access is available at only three points (Point Sal and Surf and Jalama Beaches) between Guadalupe and Gaviota, a distance of about 60 miles.

Presently, the use of the Guadalupe Dunes, Vandenberg, and Bixby and Hollister Ranch properties is low intensity, resulting in the presence of a large variety of plant and animal species. Kelp beds off the coast just east of Point Conception provide good fishing for Santa Barbara's commercial fishing fleet. Fishing is restricted off Vandenberg.

Surfing at Hollister Ranch is internationally known. Three large properties provide the longest stretch of undeveloped coastline in Central California and an unprecedented opportunity for preservation with controlled access and a single coastal trail. There has been some discussion of an LNG facility at Cojo Bay, on land where Southern California Edison once planned a nuclear power plant.

The Regional Commission has voted to keep the open quality of this area, declaring that if a large facility must unavoidably be located where it will mar the view, money to acquire the same amount of land of equivalent view quality in the same county should be provided. Commission policy also is to cluster industrial facilities and require local government approval of any privately owned coastal-dependent facility.

SUBREGION 5: SOUTH SANTA BARBARA COUNTY/GAVIOTA-RINCON

Geographically, this subregion contains many urbanized areas, starting in Ellwood on the west and stretching through Carpinteria to Rincon Creek on the east. Highway 101 is the major and only transportation corridor and serves local as well as intra-state traffic. Where the coastal plain widens in Goleta, development has spread out over agricultural land, leaving scattered parcels. The Santa Barbara metropolitan area extends east to Rincon Mountain, encompassing Goleta, Santa Barbara and Carpinteria, and north up to the foothills of the Santa Ynez mountains.

There are well-established kelp beds off the Santa Barbara coast that support fish. Small coastal streams support some steelhead trout. At the mouth of each little stream is a small lagoon, some large enough to support a pair of white-tailed kites, some not. The foothills are covered with abundant chaparral. The larger estuaries are in the populated valleys and these have suffered from siltation and

pollution from storm drain runoff, conversion of uplands to tree crops, and removal of vegetation cover. The Goleta Slough has an airport in it, what was once the Santa Barbara estuary has warehouses and sewage treatment plants, and El Estero of Carpinteria is kept biologically alive by periodic dredging. In spite of their endangered state, these estuaries supply habitat to a surprising number of birds.

The subregion's water supply is from local aquifers and reservoirs in the nearby Santa Ynez Mountains. Development is presently very near or over the safe yield level of local aquifers, and plans under discussion include groundwater mining and importation from the State Water Project.

Local agricultural land has been in lemons and avocados as long as 50 years. As flatland orchards age, they are replaced by flowers, greenhouses, or housing, while new tree crops are being planted on hillsides denuded for the purpose. The air, until possible construction of refineries, will remain relatively clean.

SUBREGION 6: RINCON

Petroleum processing, surfing, and beach cottages have been the traditional uses on the narrow terraces at the foot of Rincon Mountain in Ventura County.

The subregion functions as a transportation corridor between Los Angeles and Santa Barbara. Several clusters of cottages are found where the terrace widens. Oil processing takes place alongside the highway and out of sight on adjacent terraces. Pressures exist to intensify use; plans are being discussed to build a dump in a coastal canyon and to convert agricultural land to condominiums.

The surfing beaches of the subregion are well known. Currently the brush on the hilltops is being cleared for avocados, resulting in some increased erosion. There are several small parcels of agricultural land that afford a textural contrast with the chaparral. Highway construction on the limited beach and into the water has caused loss of sand from some beaches.

The current oil separation plants serve onshore and offshore oil production facilities. The old coast highway provides access, sports for weekend campers, and a possible site for a coastal trail. The beach cottages are slowly being replaced by large houses, but the clustering that now exists minimizes their impact.

SUBREGION 7: VENTURA-OXNARD

The Ventura and Santa Clara Rivers have cut wide floodplains through the coastal mountains. These plains provide a statewide agricultural resource, as well as relatively cheap building sites. On the Oxnard Plain there is an immediate and difficult conflict between the Coastal Plan policy of preserving prime agricultural soils and local plans for development, which include the expansion of neighborhoods with self-contained schools and parks. Subregional study on a parcel-by-parcel basis will be necessary to carry out agricultural preservation policies in this subregion.

The Ventura and Santa Clara River estuaries, Mugu Lagoon, and McGrath Lake are jeopardized by effluent, fertilizers, and siltation. This area is no longer self-

sufficient in terms of water; the Calleguas District imports water from the Los Angeles area. Air pollution levels are the highest in the Region. The most important statewide resource is the prime soil on the Oxnard Plain.

Loss of sand from rivers and interruption of littoral drift has contributed to the loss of beachfront houses on Oxnard Shores. Even with sand loss and previous bulldozing of dunes, there remains a pattern of broad sandy beaches, low dunes, and freshwater lagoons.

The subregion's economic base—agriculture, oil, and the military—is reflected in the design of the cities. They do not focus, except for parts of Ventura, their city and its activities on the coastline.

Five different and distinct beach neighborhoods are identified in the South Central Region's Intensity of Development Element. The relation of each to the coastline is different but they are the only neighborhoods that relate directly to the ocean.

Three major intensive uses of the coastline are presently under discussion: Port Hueneme beachfront redevelopment, the Ventura Marina, and an LNG terminal. In all of them desire for continued public use of the coastline will be a major issue.

Access to beaches in the subregion is good, but support facilities and parking are lacking. Access to the marinas, canals, and ports of the subregion is inconsistent. The proximity to Los Angeles and Thousand Oaks and the large population of Oxnard itself will make it necessary to plan for fairly heavy use of the beaches.

SUBREGION 8: POINT MUGU SOUTH

South of Point Mugu, the Santa Monica Mountains come down to the edge of the ocean, leaving an occasional beach at the mouth of a canyon. This subregion functions as a transportation corridor and as the outermost beach area for Los Angeles. Point Mugu State Park provides both camping and day use in an area relatively unchanged. Highway turnouts are heavily used by fishermen and over-nighters. There are some beach dwellings, but the steep hillsides and the narrowness of the coastal shelf, most of which is occupied by the highway, prevent much development. The area is designated as open space in the Coastal Plan.

The Regional Water Quality Control Board has designated the offshore water as an Area of Special Biological Significance. The hills are steep, often unbuildable, and provide open space and wildlife habitat. Landslides often occur whenever the chaparral is removed by fire or grading.

Camping on turnouts is available free to people of a wide range of income. The subregion is a natural place to intensify day-use opportunities; possibilities include buses to Mugu, hostels, fishing piers, and trails in the Santa Monica Mountains.

SUBREGION 9: CHANNEL AND CHANNEL ISLANDS

The Santa Barbara Channel stretches from Point Conception to Point Mugu, from the south Santa Barbara coast to the Channel Islands. The wide stretch of sea within the channel is relatively calm and easily crossed by small boats, encouraging

intensive use by pleasure boats and fishermen. Numerous reefs and points provide habitat for shallow water species. Conflict among fishermen, recreationists, and the oil industry over the use of the channel and the islands has been going on for years and has recently intensified.

Abalone and sea bass are found near the shore in rocky crevices in the sea bottom. Barracuda and other migratory fish inhabit the kelp beds east of Point Conception. Where outfalls and storm water runoff have not polluted the nearshore areas, marine life is particularly abundant.

The Channel Islands provide some of the remaining native California plant habitats, and some of the remaining open, uncultivated land in California that is closely related to the sea. Marine birds and animals raise their young on the islands; unique and ancient species of plants have persisted there. Abalone grow in the tide pools. The bluffs and relatively barren slopes provide a sequence of linear forms visible from the sea. Miles of open shoreline offer a sense of isolation that is not available elsewhere on the California coast. From the mainland, the islands appear or fade as the weather changes, making a view of the ocean a potential view of the islands as well.

Access to the channel and the islands is by boat. During the summer months small boats cruise the channel and anchor in island coves, and sportfishing boats offer day trips. Only Anacapa National Monument permits onshore use. The number of visitors may increase with the expansion of marinas on the mainland but at the same time, should be fairly easy to control at the three marinas.

The Regional Commission has adopted policies to preserve the islands, allowing development only for low-intensity recreational use. Limiting the number of visitors in the future may be necessary to preserve the islands, like the Sierras, as a private experience.

The amount of oil installations permitted in the channel and the number and kind of outfalls will affect the area of the channel usable for recreational boating or fishing, and the number of productive fishing grounds. At the moment fishing grounds in the channel are on the Ventura flats immediately offshore west of Goleta, and around the islands--where there is little onshore development of any kind. Marine structures, even underwater completions, interfere with commercial fishing operations for a considerable distance near them, depending on tidal currents.

The Santa Barbara oil spill of 1969 killed animals at the sea lion rookery and many pelagic birds. Conflict surrounding present oil drilling reflects community anticipation of the effects of more spills and public dislike of oil on the beaches.

South Coast

The South Coast Region--Los Angeles and Orange Counties--is essentially urbanized, but a few key areas still remain in a natural or nearly natural state. These remaining cliffs, hills, mountains, estuaries, and wetlands create dramatic contrasts to the Region's urban character. Traveling along the coast by land, air, or sea, one is vividly aware of waterfront urban areas, punctuated by natural preserves. This considerable variation in topography and character of physical development is matched by substantial variations in social structure, economic and financial well-being, land ownership patterns, and jurisdictional control.

SUBREGION 1: MALIBU

This subregion extends some 25 miles from the Ventura County line to Sunset Boulevard and includes unincorporated Los Angeles County territory and a small section of the City of Los Angeles. The rugged Santa Monica Mountain backdrop is cut by deep narrow canyons perpendicular to the coast. The Malibu Creek watershed is the largest watershed in the subregion, draining some 67,000 acres. It terminates at the Malibu estuarine lagoon. This lagoon and many of the canyons are prime habitat for birds and other wildlife. Fire, floods, and landslides periodically threaten development in these areas.

The marine environment of this subregion from Malibu Point westward to the Ventura-Los Angeles County line is essentially in a natural state. Kelp beds extend intermittently in this area, providing habitat for many species of sea life. The marine environment from Malibu Point eastward to Topanga Canyon has suffered some biological impairment. Kelp beds have disappeared, but reef and rocky zones still provide habitat for many fish species.

Broad sandy beaches at Leo Carrillo, Zuma, Westward, and Surfrider beaches provide excellent sun bathing and swimming opportunities for the public. Access to these beaches and the entire Malibu Coast is provided by Pacific Coast Highway. Its road capacity is exceeded regularly on summer weekends as recreationists attempt to reach the beach or enjoy a scenic drive. Newly opened Dume-Kanan Road, Malibu Canyon Road, Encinal Canyon Road, and Topanga Canyon Road link the San Fernando Valley with the beaches. The Civic Center area, located at the mouth of Malibu Canyon, is the major urban node.

Canyon residential development occurs most notably in Topanga, Tuna, and Malibu Canyons. Both commercial and residential strip development flank Pacific Coast Highway from Point Dume to Sunset Boulevard. Residential development seaward of Pacific Coast Highway has blocked access along some 13 miles of the Malibu Coast.

Some of the policies applying specifically to the area or especially appropriate for implementation here include the creation of a marine park and reserve from the Ventura-Los Angeles County line to Malibu Point. Planning for such a park should be coordinated with the Santa Monica Mountain Park plans. Canyon recreation trails to connect upland parks with beach areas should be supported. These trails could serve as spurs off an upland coastal trail, and should be included in a State coastal trails system. A coastal scenic route should be established with special directional signs, vista points, and rest stops. To increase beach access, a State agency should be given the authority to bring suit on behalf of the public to enforce existing access rights, and additional easements for both physical and visual access should be acquired. Natural areas of regional or statewide significance should also be protected. Adequate acreages should be set aside to sustain the genetic health of the flora and fauna.

SUBREGION 2: SANTA MONICA

This subregion is bounded by Sunset Boulevard and the Ballona Creek Channel and includes the City of Santa Monica and its neighborhood of Ocean Park, the City of Los Angeles, including the communities of Pacific Palisades, Venice,

and Palms-Mar Vista, Culver City, and the unincorporated community of Marina del Rey. Development in this subregion varies from single family residences on the unstable hills of Pacific Palisades to concentrations of high-density and high-rise residential and commercial uses along the bluffs in Santa Monica and in the vicinity of Marina del Rey. Generally, residential densities are high in the strip of land directly abutting the coast.

The marine environment for the entire Santa Monica Bay has suffered significant biological impairment. Both domestic and industrial wastes have adversely affected water quality throughout the bay. The Ballona Creek Tidal System, once an extensive wetland, has been artificially modified to accommodate the canal community of Venice and the more recent development of Marina del Rey. Nevertheless, the marina, good surf, wide beaches, and fishing piers provide outstanding ocean-oriented recreation of regional significance. Inland access is provided by the Santa Monica Freeway.

South Santa Monica and North Venice seek to regain and restore the character they once knew as pleasant resort villages beside the sea. The high level of recent urban development has made parking and access to the shoreline difficult. Old oil derricks, utility lines, fences, and walls of structures that block views of the ocean and marina detract from the scenic qualities of the subregion.

The old Venice area, including the Canal and south beach areas of Santa Monica, should be protected and preserved. Preservation and, where necessary, restoration of remaining older structures characteristic of Venice and Ocean Park beach front should be encouraged. Additionally, an interagency study should be carried out to determine the potential for wetland restoration in the Ballona Creek tidal system. To increase coastal recreation and viewing opportunities, the bicycle trail along the beach should be completed. Wintertime use plans should be prepared to efficiently utilize beach resources.

SUBREGION 3: LAX-EL SEGUNDO

This subregion extends from the Ballona Creek Channel to the southerly boundary of El Segundo. It includes the City of El Segundo, portions of the City of Los Angeles, including the communities of Playa del Rey and Westchester, Inglewood, Hawthorne, and unincorporated Los Angeles County territory. It is characterized by intensive commercial and industrial activities. Los Angeles International Airport, the Hyperion Sewage Treatment Plant, the Scattergood Power Plant, the Southern California Edison Power Plant, and the Standard Oil Refinery dominate the El Segundo nearshore.

The marine environment has suffered significant biological impairment resulting primarily from the discharge of waste water and sludge from the Hyperion Plant. The subregion is heavily urbanized and includes high rise hotels, offices, and intense commercial development in the vicinity of the Los Angeles Airport. However, major undeveloped open space remains adjacent to Ballona Creek with potential for wetland restoration. Wide sandy beaches are heavily used by inland public. Dockweiler Beach is especially popular with minorities. The Airport Sand Dunes, the major surviving dune formation in the South Coast Region, lies between the airport proper and Dockweiler Beach.

The expansion and modification of industrial and commercial facilities is being planned. Pressures also exist for offshore oil development. The neighboring communities are facing the problems of open space preservation, traffic congestion, noise, smoke, and odors due to the intensification of land use.

Some policies applying specifically to this area or appropriate for application here include maintenance of adequate buffers between incompatible uses and the provision of recreational uses in these buffer areas; protection and restoration of the Airport Dunes for habitat, educational purposes, and compatible recreational uses. The recycling of non-coastal-related industries as they become obsolete to more coastal-dependent land uses shall be considered. No new non-coastal-related industry shall be permitted in the nearshore area. To prevent erosion and to increase public visual access, the acquisition of bluffs is recommended as a long-range objective.

SUBREGION 4: SOUTH BAY

This subregion extends from the northern limit of El Porto to the southerly limit of Torrance. It includes the unincorporated community of El Porto, the Cities of Manhattan Beach, Hermosa Beach, Redondo Beach, Torrance, Lawndale, and portions of Hawthorne and Gardena. The sea and the wide sandy beaches are the only remaining natural elements in this area. Coastal-related commercial activities attract intensive public use. El Porto, Manhattan Beach, and Hermosa Beach are old beach communities with typical small lot subdivision. Along the Redondo Beach shoreline, straight-lined medium rise apartments are characteristic. Along the shoreline, King Harbour, the commercial pier, and the power generating plant are visually dominant. Strip commercial development flanks the north-south arterials and includes several "downtown" commercial districts. Inadequate public parking results in traffic and parking problems during summer months.

High-rise development is occurring in the subregion. Single-family development is recycling to higher densities. More tourist commercial development and redevelopment is proposed for the King Harbour area. Development pressures in Torrance may adversely affect Madrona Marsh, an important freshwater habitat.

Some of the policies applying specifically to this area or appropriate for application here call for encouragement of private groups and property owners to participate and contribute to the beautification and enhancement of the visual character of these coastal communities; replacing non-coastal-related industries, as they become obsolete, with more coastal-dependent land use; and support of the City of Torrance proposal for preserving Madrona Marsh.

SUBREGION 5: PALOS VERDES

This subregion includes the City of Palos Verdes Estates, Rancho Palos Verdes, Rolling Hills Estates, Rolling Hills, and portions of unincorporated Los Angeles County territory. The Palos Verdes Peninsula, with its hills, cliffs, and rocky shoreline, has significant open space, some agricultural uses, coastal sage scrub and chaparral habitat intertwined with development, which has resulted in very pleasant residential communities. Harmony without monotony has been a goal of these communities. The marine environment, however, has suffered significant biological impairment; minor kelp beds in poor health remain.

High-value land is creating pressure for increased urbanization and high-density uses. There is a demand for public access to the bluffs at the edge of the water and for preservation of scenic resources including the rocky shore.

Some of the policies applying specifically to this area or appropriate for application here include protection of bluffs, rocky beaches, and important areas of wildlife habitat including coastal sage scrub, chaparral, and grasslands; preservation of prime agricultural land and the minimization of conversion of other agricultural lands. Acquisition of an easement along the bluffs at the edge of the water and on federal land to increase the public's access to the coastal scenic experience, and for hiking trails, equestrian trails and bicycle paths, is also recommended. Public owned lands not needed for originally planned uses should be used for public open space and recreation, for the preservation of natural habitats, or leased for agricultural purposes. Ridge and canyon development should be discouraged.

SUBREGION 6: HARBOR AREA

This subregion includes the communities of San Pedro, Wilmington, Harbor City, in the City of Los Angeles, the cities of Lomita and Carson, the Ports of Los Angeles and Long Beach, and unincorporated Los Angeles County territory. Housing development of all types covers the hills of San Pedro and along with undistinguished commercial areas overlooks a major urban renewal project, intensive harbor activities, oil extraction sites, a freeway, heavy industries, and major public utility plants (sewer and power). Military reservations provide magnificent views and open space adjacent to the ocean in the focus of highly urbanized and industrialized areas. A breakwater approximately eight miles long protects the twin harbor activities. Dredging and filling of the harbor area has had significant environmental impacts on the area's marine environment.

Planned harbor development includes major filling and dredging to accommodate increased shipping traffic and related development, and the construction of small-craft marina facilities at Cabrillo Beach and Fish Harbor. In the residential areas there is a trend to recycle from low-and medium-income housing to costlier multiple-family developments, resulting in the relocation of a portion of the resident population.

Some policies applying specifically or appropriate for application here include providing increased public access to the shoreline and harbor area by connecting significant vista points, scenic areas, interesting harbor activities, and Alamitos Bay by bike routes and walkways for recreational and educational purposes; providing landscaping to allow visual relief within the harbor area and adequate buffer between residential and industrial structures; enhancing and protecting the unique characteristics of the San Pedro area by prohibiting development on natural ridges and in canyons and by retaining slopes of over 35 per cent as open space; assuring that the locations of structures do not eliminate or reduce views from the remaining vista points; preserving and possibly restoring remaining natural areas; accommodating only essential port development through improvement to existing port complexes; requiring coordinated general plans to guide future development with emphasis on environmental protection; encouraging rail service; and accommodating maritime military activities.

SUBREGION 7: LONG BEACH

This subregion is bounded by the port of Long Beach and the Los Angeles River on the west and the Los Angeles/Orange County line on the east and in-

cludes the Cities of Long Beach and Signal Hill, and sections of Lakewood, Hawaiian Gardens, and unincorporated Los Angeles County territory. The Long Beach city profile varies from single-family to high-rise development. A great diversity in lifestyle exists in this city. Downtown structures are high rise, medium rise, and massive—a mixture of old and new. Gradual redevelopment is changing the city's character as old buildings are replaced by new office, residential, and civic structures. The eastern part of Long Beach to Alamitos Bay is generally stable and well maintained. However, unique single-family development along the shore is being replaced by multistoried high-density development. The Queen Mary, the arena, Belmont Pier, and the Long Beach Marina attract recreationists from inland and surrounding cities.

The City of Long Beach is planning redevelopment projects for the downtown area, coastal areas, and industrial areas. Pressures exist for a major marina at Pier J, tourist commercial complexes, highrises in the vicinity of the central business district, and major development on vacant land in the vicinity of Alamitos Bay.

Some policies applying to this subregion or especially appropriate for implementation here include restoration and enhancement of historical character as a beach community, and the enhancement of view points and view corridors by appropriate acquisition. Medium- and high-rise buildings on view sites should be designed to maintain ground-level view access between or through the structures and public access should be provided to appropriate vantage points in upper levels. Development in the Naples and Belmont Shores areas should be regulated in order to enhance coastal views, public access to the beach, and the general lifestyle and character of these areas. Improvement of the mass transit system is also recommended. The Pier J Marina proposal appears to have the least potential for adverse environmental impact of all proposals for new marinas in the South Coast Region.

SUBREGION 8: ISLANDS

The offshore islands of San Clemente and Santa Catalina make up this subregion. San Clemente, the more remote of the two islands, is currently restricted to military use. Unique natural habitats flourish on San Clemente Island, and the marine life offshore is in a healthy state.

The nearshore island of Santa Catalina remains almost entirely open and undeveloped except for the City of Avalon and a small developed enclave at the Isthmus. As a result of a recently signed agreement between the Santa Catalina Island Company and the County of Los Angeles, 41,000 acres of company property will be maintained for conservation, soil reclamation, and recreation and education uses. Additionally, a soon-to-be-completed agreement between Santa Catalina Island Company and the Santa Catalina Conservancy will provide for transfer of open space easement lands, White's Landing, and Parson's Landing to the Conservancy. Once the agreement is effected, these lands will be conserved in perpetuity.

At present, camping and picnicking are permitted at many of the coves which indent the shoreline and at designated locations in the interior. Skin and SCUBA diving are popular underwater recreation activities most frequently carried out from charter boats moored offshore.

The City of Avalon is the major entrance point and destination of visitors crossing from the mainland, either by boat or airplane. It is also the major residential and commercial area providing a variety of tourist commercial, cultural, and recreational facilities. Residential development is proceeding slowly and will be contained by the extent of the open space easement, and the capacity to expand existing utilities and water supply.

Some policies applying either specifically to this area or appropriate for application here include the prohibition of medium-and high-rise development. Wherever construction does occur, it should be designed to be compatible with the existing character of Avalon and other settlements on the island, should allow the visual form of the islands to dominate (hence ridgetop development should not be permitted), and should not exceed the limit that can be supported by the local natural resources such as water on Santa Catalina. The natural productivity of the intertidal and nearshore environment along Caltalina and San Clemente shall be maintained and kelp beds and reefs should be designated as natural reserves. All islets shall be protected as sanctuaries for sea birds and marine mammals. Research and educational opportunities shall be encouraged and access to currently restricted areas should be permitted for such uses.

SUBREGION 9: NORTH COAST

The north coast of Orange County extending some 12.5 miles from the San Gabriel River Channel to the Santa Ana River Channel forms this region. It includes Seal Beach, Huntington Beach, portions of Los Alamitos, Cypress, Garden Grove, Westminster, Fountain Valley, and unincorporated area including the community of Sunset Beach. Until early in this century much of the near-shore was part of a vast tidal and alluvial wetland system, with freshwater inflow from the San Gabriel and Santa Ana Rivers. While wetland remnants remain, the subregion is now also characterized by residential, recreational, and offshore and onshore oil field development. Coastal Seal Beach has an identifiable village character partly because it is wedged between the San Gabriel River and the Seal Beach National Wildlife Refuge. The two beach colonies of Surfside and Sunset Beach meld together just south of the Refuge. Huntington Harbour, located east of the beach communities and created by dredging and filling Sunset Bay, is a boating-oriented, high-income development within the City of Huntington Beach. Boating activity in the Harbour is primarily private. The County maintains a boating facility at Sunset Aquatic Regional Park. Otherwise public access to Harbour waters is extremely limited.

During the past twenty-five years, Huntington Beach, the largest city in the subregion, has grown from a truck-farming community of 5,200 to a city of 150,000. Almost all the rich agricultural soil of the Santa Ana River flood-plain now within the city limits has been converted to residential and commercial use. All remaining agricultural lands are designated by the city for eventual conversion to residential and industrial use. Oil production lands within the city and in other sections of the subregion are recycling to residential and commercial use.

This subregion possesses outstanding recreational resources. The wide, sandy beaches are almost entirely in public ownership. Besides swimming and bathing opportunities, the beaches of the subregion support some of the best surfing in the world. The Seal Beach and Huntington Beach piers support fishing and

coastal viewing activities. The automobile is the major means of recreational access. On weekends, parked cars line the seaward side of Pacific Coast Highway, blocking ocean views and adding to traffic congestion.

Some policies applying either specifically to this area or appropriate for application here include those calling for restoration of Bolsa Chica Bay and the Santa Ana Rivermouth wetlands. Access to beaches and bicycle and pedestrian paths in closed communities should be provided. Oil pumping, drilling, and storage facilities should be removed once the resource becomes depleted. Street parking seaward of the coast road should be prohibited with inland parking and transit investigated as alternatives. Commercial visitor facilities should be increased within Huntington Harbour and at the private beach colony of Surfside. The San Gabriel and Santa Ana River trails should be extended to reach the beach. Non-coastal-related industries, as they become obsolete, shall be considered for recycling to more coastal-dependent uses.

SUBREGION 10: NEWPORT/MESA

The Newport Beach/Costa Mesa subregion extends some 6.5 miles from the Santa Ana River mouth south to the southerly limits of Newport Beach. The City of Newport Beach, Costa Mesa, and portions of Santa Ana, Tustin, Irvine, and unincorporated Orange County territory are within the subregion. Important natural areas include Upper and Lower Newport Bay and the San Joaquin freshwater marsh.

Lower Newport Bay serves as a major marina resource with a public and private berthing capacity of some 7,000 boats. The lower bay is the focus of a water-oriented lifestyle for those who reside on the small isles within the bay and on the Balboa Peninsula. Visitors can enjoy ocean and bay vistas from the beach walk or two city piers, or from restaurants which line the perimeter of the Bay. Swimming and bathing opportunities are available along six miles of public owned beaches. Traffic congestion and lack of parking, however, are major barriers to beach access. Wildlife observation opportunities are available in Upper Newport Bay and the San Joaquin Marsh.

The Upper Bay to the 10-foot contour was recently purchased by the State. Current plans call for an interpretive center and bike path along the bay edge. Opportunities still exist to acquire bluffs above the bay for viewing and wildlife observation. Although the Upper Bay has been purchased by the State, significant runoff and siltation problems remain.

Major employment centers are located at Newport Center, a recently developed regional shopping and office complex, and inland at the Irvine Industrial complex adjoining the Orange County Airport. The University of California at Irvine also provides a significant employment and cultural resource.

Policies applying specifically to the subregion or especially appropriate for implementation here include the preparation of a surface runoff and silt control plan for the San Diego Creek watershed to minimize man-made siltation and curtail pollutants in Upper Newport Bay. To preserve vestiges of historic Newport, the character of the area surrounding the Balboa Pavilion, as well as the building itself, shall be preserved. New structures should retain the character and density of the surrounding environment. Easements should be acquired to establish hiking paths and bikeways along the edge of the water to increase public access to the coastal scenic experience.

SUBREGION 11: IRVINE

This little developed subregion, extending some 3.5 miles between the city limits of Newport Beach and Laguna Beach, is in the single ownership of the Irvine Company. The offshore is characterized by sand and mud bottoms, submerged rocks and reefs. Kelp beds provide habitat for many marine species. The landforms are relatively unaltered physically, with coastal bluffs and marine terraces backing sandy beaches and rocky tidepools. The back shore is characterized by ridge and canyon topography, with coastal sagebrush, grassland, and riparian vegetation. Grazing activity is presently supported on these uplands. Although there are no incorporated cities, residential development exists at Irvine Cove, Crystal Cove, and the El Moro trailer park development, located on the beach just north of Abalone Point. An equestrian center exists on the marine terrace seaward of Pacific Coast Highway. This subregion is almost entirely undeveloped and remains the major opportunity for open space preservation along the Orange County coast.

Policies applying specifically to the subregion or especially appropriate for implementation here include an underwater park and reserve system from Cameo Shores to Abalone Point with management closely coordinated with adjacent land uses. Both visual and physical access to the coastline shall be maximized by acquiring continuous pedestrian easements along the top of the bluff and easements to the beach, except for those areas of the beach that are considered ecologically fragile. Los Trancos, Moro, Emerald, Boat, Shady, and Willow Canyons should be preserved as natural areas.

SUBREGION 12: LAGUNAS

The Laguna/South Laguna subregion extends along some 10 miles of shoreline from the northern limits of Laguna Beach to the southern boundary of the planned community of Laguna Niguel. The subregion includes the City of Laguna Beach and the unincorporated community of South Laguna. Rising behind these developed areas, the rugged hillsides are largely covered with coastal scrub and chaparral, enhancing the setting of these coastal communities. Major canyons leading to the coast include Laguna, Aliso, and Salt Creek. Aliso Creek and watershed provide riparian woodland, coastal sage scrub, chaparral and grassland habitat. Many water associated bird species frequent the lower creek. A private golf course is situated at the mouth of the canyon. Other prime habitat areas include the Laguna Lakes in Laguna Canyon and Niguel Lake, now part of Laguna Niguel Regional Park.

The offshore marine habitat of the subregion is extremely sensitive. Significant offshore areas are now protected as part of the Laguna, South Laguna, and Niguel Marine Life Refuges, although increased public education programs should be established at these sites.

Access to the coast from the inland areas is limited to Laguna Canyon Road and Crown Valley Parkway. Pacific Coast Highway is highly congested. Such congestion is likely to increase with development pressures currently being experienced, especially in Laguna Niguel, in the hillsides above Laguna and South Laguna, and in other sections of southern Orange County. Local citizens are advocating a greenbelt concept to control hillside development and protect habitat. Access to the beach in areas such as Emerald Bay and Three Arch Bay is blocked by private development.

Policies applying specifically to the subregion or especially appropriate for implementation here include the provision of public transit to take people from inland parking areas to the beach. To increase visual access and enjoyment of marine resources, an observation center should be established at Crescent Bay Point, and the marine life on Seal Rock should be protected from human disturbance. A trail system in the hills above Laguna and South Laguna would provide magnificent vistas for hikers and equestrians. Such a system, if established, should be considered for inclusion in a statewide coastal trails system. To increase beach access, the State should be given authority to bring suit on behalf of the public to enforce existing access rights. Trailers should be removed from the beach either through acquisition and/or enforcement of existing public access rights.

SUBREGION 13: SOUTH COAST

This subregion extends along approximately 9.5 miles of southern Orange County shoreline from the southern boundary of Laguna Niguel to the San Diego County line. It includes the City of San Clemente, the unincorporated communities of Dana Point and Capistrano Beach, and the inland City of San Juan Capistrano. The offshore area is characterized by submerged reefs, rocks, and kelp beds, some of which are protected within the Doheny and Dana Point Marine Life Refuges. A major marina serving southern Orange County is located below the bluffs at Dana Point. Associated with the marina development are tourist commercial recreation facilities as well as a picnic and temporary camping area. South of the marina, Doheny and San Clemente City and State Beaches provide swimming, bathing, and camping. Between Doheny and San Clemente City Beach, a strip of private single-family dwellings and trailers are located directly on the beach.

Access to the subregion is provided by the San Diego Freeway which cuts through the Capistrano Valley to parallel the coast about one mile inland. The A.T. & S.F. Railroad also passes through the valley and proceeds for seven miles on beach sand. The railway represents a major opportunity to provide mass transit service to the beach from major urban areas in Los Angeles and Orange Counties. Its present alignment, however, acts as a barrier to beach access. Intensive residential development is taking place in the subregion. The Capistrano Valley is rapidly developing with tract housing. Planned residential development just north of Dana Point, if approved, will eliminate one of the few remaining opportunities to provide recreation opportunities where access is relatively good.

Policies applying specifically to the subregion or especially appropriate for implementation here include the limitation that grading be allowed only to provide a pad for a structure and access to it and that structures not eliminate or reduce coastal views from lateral roads or remaining vista points.

San Diego Coast

The San Diego coastline is 76 miles long. It includes areas of eight cities, the unincorporated county, State-owned lands, and substantial Federal holdings.

The San Diego Coast Region is varied in its physical and manmade character and natural resources. It ranges from the scenic bluffs and beaches of Camp Pendleton to the urban San Diego Bayfront and the Port of San Diego, to the silvery sands of the Coronado Silver Strand and the rich Tia Juana estuary on the border with Mexico.

The San Diego coastline includes pleasant and scenic communities and places for a broad cross-section of the population to live.

Enhanced by its climate, the San Diego coast is a national recreational resource offering a wide range of recreational opportunities. Tourism is an important industry in San Diego. Although some are eroding, San Diego's beaches are important regional and statewide resources.

The San Diego coastline is endowed with eight coastal lagoons and other wetland areas, many of which are in dire need of protection, enhancement, and consistent management.

Coastal agriculture and floriculture in San Diego, particularly in the North County is an important statewide and even a national resource.

SUBREGION 1: PENDLETON COAST

Camp Pendleton is a largely undeveloped U.S. Marine Corps base. It serves as a buffer between the developed coasts of Orange-Los Angeles and San Diego Counties, and includes some 17 miles of coastline.

Most of the coastal viewshed in Camp Pendleton is undeveloped. With the exception of 24,000 feet of beach frontage that is under a 50-year lease to the State Department of Parks and Recreation and open to public use, the entire shoreline is controlled by the military. On the immediate shoreline in northern Camp Pendleton is the San Onofre nuclear power plant site; unit 1 has been built and the second and third of the projected units are under construction. At the Camp's southern end are agricultural lands under lease to private growers.

The open scenery of Camp Pendleton contrasts with Southern California's urbanization. The chaparral which covers its hillsides east of I-5 is a rich wildlife habitat. The most prominent physical features of the Camp Pendleton shoreline are the uniquely scenic coastal Torrey Sandstone and Del Mar bluffs and barrancas, shaped partially by natural and man-induced drainage patterns. Some of the sand on the beaches below is supplied by the eroding bluffs and transported along the coast by wave action (littoral drift).

The Marine Corps manages Camp Pendleton's three wetlands. The San Mateo and Las Flores marshes are non-tidal. Santa Margarita Marsh, the largest, is subject to tidal action. As late as 1958, steelhead trout were observed near the mouth of the Santa Margarita River. The Marine Corps has instituted a nationally acclaimed natural resource and wildlife preservation and conservation program.

The State Department of Parks and Recreation has expressed interest in obtaining more of the Camp Pendleton shoreline for public use. With the exception of San Onofre State Beach, which has been designated as an intensive use zone, the

Regional Commission has tentatively designated the Pendleton beaches for remote or very low-intensity day and/or overnight use. Additionally, several classic surfing areas—Trestles, Church, and San Onofre—should be reserved for this coastal-dependent activity.

The greatest existing pressures for development within Camp Pendleton are around Basilone Road and east of I-5, where a recently constructed shopping complex serves military families residing to the east. To comply with the Plan's adopted development policies, any further development in the area should conform to existing landforms, be designed to enhance the scenic qualities of the area, and should be located inland (east of I-5) when alternative sites exist. As the Coastal Plan is certified by the Federal government under the Coastal Zone Management Act of 1972, all government construction not related directly to military operations or national security will be governed by the Plan. Until then, State-Federal cooperation should continue.

Any coastal areas of Camp Pendleton declared to be surplus land should be retained in public ownership with first priority given to public recreation with careful control and management stressed. Additional shoreline that is open to the public should be reserved for low-intensity recreation. The wetlands should be preserved with only minimal alterations as necessary to carry out a coastal agency-approved watershed management plan. Restoration of the mouth of the Santa Margarita River as spawning habitat should be explored. Any alterations to existing landforms and habitat should include specific provision for rehabilitation of cuts and restoration of vegetation. The Camp Pendleton area should continue to serve as a non-urbanized buffer between Orange-Los Angeles and San Diego Counties.

SUBREGION 2: OCEANSIDE

The Oceanside/San Luis Rey subregion extends from Camp Pendleton to Oceanside's southern boundary, but does not include Buena Vista Lagoon. The inland boundary encompasses the coastal-related agricultural and potential agricultural lands of the San Luis Rey River Valley, which extend inland approximately 10 miles. Most of the area west of I-5 is already developed with mixed residential and commercial uses. East of I-5, development is less intense while further inland are extensive undeveloped lands in (or suitable for) agricultural uses.

A major resource of the subregion is a 4,000-acre, relatively undeveloped floodplain, mainly used for strawberry and tomato production. The important wildlife areas of the San Luis Rey River are the river mouth and Narrows (east of I-5). Another wetland area is the Loma Alta Slough. The ocean shoreline and sandy beach areas of Oceanside are also significant regional and statewide resources.

Construction of the Del Mar Boat Basin and Oceanside Small Craft Harbor has disrupted longshore sand transport in the Oceanside littoral cell. The harbor has become a sand trap for an estimated 2.5 million cubic yards of sand which must be dredged out periodically and deposited on the beaches to the south. The winter tides have washed away a beach once 200-300 feet wide and have created the need for shoreline structures to protect the South Pacific Street beachfront homes. Replenishment of the lost beach sand and the institution of a program for sand maintenance and bypass around the harbor entrance is of high regional priority.

Pacific Street, which runs along a coastal bluff parallel to the beach is a scenic roadway. Another important vista designated for protection by the San Diego Comprehensive Planning Organization is the view of the ocean and San Luis Rey River from I-5 at the point where the freeway crosses the river.

Although suffering from erosion in the south, the beaches of Oceanside are of good quality and can support intense recreational use. With additional access facilities, and non-auto transportation systems, the Oceanside beaches could easily accommodate more use, so the Regional Commission has designated Oceanside as an intensive recreational use zone.

To eliminate or mitigate adverse effects upon the River Valley, its floodplain and agricultural areas, the following development proposals should be carefully evaluated: the proposed relocation of a freeway (new Route 252) through part of the valley and its agricultural areas; a major flood-control channel improvement project proposed by the Corps of Engineers; and continued scattered residential development in the floodplain resulting in the conversion of coastal agricultural areas and the inducement of a costly flood control project.

The Harbor/Strand area felt considerable development pressure prior to the passage of Proposition 20, resulting in a 17-story condominium near the harbor, a 500-unit apartment project on the beach, and a proposed nine-story hotel, also in the harbor area. Continuing pressures have resulted in some fragmented development along the Strand area.

The two most significant development proposals are expansion of the Small Craft Harbor to a proposed 2,000 slips by the Army Corps of Engineers, and the redevelopment of the Harbor/Strand area. Both can and should have a positive influence on the immediate area and the region. Expansion of Oceanside Harbor will relieve the pressure for new marinas elsewhere (e.g., Agua Hedionda Lagoon), and can make a significant contribution to correcting the sand bypass/beach erosion problem. The proposed redevelopment project would revitalize a deteriorating beach area. Along with the harbor expansion, it is an opportunity to create a beach-oriented tourist commercial resort area. Both projects should be undertaken only with careful attention to enhancing public access to and enjoyment of the shoreline, and protecting and preserving the habitat areas in the San Luis Rey rivermouth. In basic conformance with CPO's Initial Coastline Study and Plan, the San Luis Rey rivermouth and narrows are recommended for priority acquisition as a wildlife reserve.

Special studies on the San Luis Rey rivermouth and Loma Alta Slough should develop a comprehensive plan for their future management. Special study of the Harbor/Strand area should address the issues of resource preservation and enhancement, appropriate land use and intensity of use, development standards, landscaping and design themes, transportation alternatives to the automobile (e.g., Amtrak stop, trams), and the potential of the Strand as a pedestrian mall in developing a specific area development plan.

SUBREGION 3: CARLSBAD

This subregion extends from the north shore of Buena Vista Lagoon south to the Carlsbad city limit along the shore of Batiquitos Lagoon. From the shoreline, the boundary extends generally five miles inland to the proposed coastal zone boundary. The coastal area of Carlsbad between Buena Vista Lagoon

and Agua Hedionda Lagoon is largely developed. In contrast, the area to the south, consisting largely of areas annexed over the past several years and areas that Carlsbad is in the process of annexing, is mainly undeveloped, the major exception being the San Diego Gas & Electric Company Plant and some residential development adjacent to and near the shoreline south of Agua Hedionda Lagoon. The southern and inland portions of the subregion support considerable agricultural use.

The prime natural resource and habitat areas of the subregion are the two lagoons. Buena Vista Lagoon is a coastal freshwater body which because of its biological significance, has been acquired as a State wildlife preserve. Agua Hedionda Lagoon is subject to tidal action, with the tidal prism maintained by SDG&E. The lagoon supports recreational uses such as boating and water skiing.

The subregion includes many acres of prime and potentially prime agricultural lands, intensively cultivated for nursery and truck crops and flower and bulb production. Carlsbad floriculture production, enhanced by a coastal location, is of statewide and national importance. The ocean shoreline itself is also a significant resource.

The Carlsbad area contributes much to the visual qualities of the San Diego Coastal Region. The two lagoons create visual corridors from I-5 to the ocean and to inland areas. The lagoons and surrounding open spaces provide visual relief in contrast with nearby urban areas. Perhaps the most prominent visual features of the subregion are the flower and bulb fields. When in bloom, they provide the passerby with a veritable symphony of color. Other distinct architectural and historical landmarks in Carlsbad are the Twin Inns and Royal Palms.

Carlsbad possesses some of the finest beach frontage in the entire region, but there are problems of public access along several segments of the shoreline. That area extending southward from Buena Vista Lagoon to Carlsbad State Beach does have parking, but it is insufficient to meet the overall demand and some of the parking is located on the sandy beach. Additionally, the recent rapid transition from single-to multiple-family along the major access routes to the State Beach could have adverse impacts upon public beach access. Farther south, the private beach owned by the San Diego Gas & Electric Company is reserved for the use of its employees. The other State-owned park, South Carlsbad State Beach, presents another type of access problem while its primary function is to meet the ever growing and legitimate demand for shoreline camping facilities, only minimal facilities have been provided for day use.

Of all the areas in the San Diego Region, Carlsbad is experiencing the most severe pressures. A CPO report anticipated that the present population of 17,500 could grow to from 46-60,000 by 1985. Of greatest concern to the Commission, and supported by the CPO report, is that most of the new development would occur on new lands, lands now in or suitable for agricultural use, and vacant lands that serve as buffers to the lagoons and agricultural lands. Current property tax assessment practices accelerate the conversion of agricultural lands. Many parcels too small to qualify under the Williamson Act are especially suitable for coastal dependent floriculture and agriculture.

Carlsbad's new Land Use Element of the General Plan recognizes the undesirable impacts of uncontrolled growth and proposes several strategies to manage future growth and preserve open space and resources. Such strategies include a growth monitoring plan, an urban reserve program, and the designation of special

treatment areas. Another issue critical to the future of Carlsbad is the redevelopment of its central business district, now in its initial stages. This district has been designated as a Special Study Area to promote the preparation of a redevelopment plan that would revitalize the downtown area while simultaneously relieving development pressures on resource areas. The downtown area should also be designated as a manmade resource because of its opportunities for low-and moderate-income housing and pedestrian access, and its small scale. Through redevelopment, these positive characteristics can be further enhanced, and other factors improved to create a truly distinctive coastal business district.

Protection of the lagoons and surrounding areas, protection of floriculture and agriculture, and maximum public access to beaches are prime concerns in the Carlsbad subregion. Accordingly, the lagoons and their buffer areas have been designated as special study areas, as have the productive and potentially productive agricultural lands. Four sites for priority acquisition of title or public use rights have been identified. Acquisition surrounding Buena Vista Lagoon would promote preservation and allow passive recreation. More intensive recreational use should be accommodated in an acquisition surrounding Agua Hedionda Lagoon, and lateral access should be provided along the shoreline. Acquisition of the Encina Power Plant beachfront and extension of South Carlsbad State Beach to the north and south would provide much needed public beach frontage for the region's fastest growing area.

SUBREGION 4: SAN DIEGUITO: LEUCADIA, ENCINITAS, CARDIFF, SOLANA BEACH

The San Dieguito subregion includes the unincorporated communities of Leucadia, Encinitas, Cardiff, and Solana Beach. The boundaries extend from (and include) Batiquitos Lagoon on the north to the Del Mar City line in the south. The inland boundary follows the location of prime and potential prime agricultural lands, with five miles being the average inland extent. Most of the land is already developed, although at a very low density, consisting primarily of single-family residences and duplexes.

The most critical and valuable resource areas include Batiquitos and San Elijo Lagoons, and the ocean shoreline and adjacent coastal bluffs. Some kelp harvesting takes place off Leucadia and Encinitas. The San Dieguito communities also contain substantial lands being used for agricultural and floricultural production.

Batiquitos Lagoon, rarely open to tidal action in recent years, has been polluted by sewage and runoff from San Marcos Creek. Selective and careful dredging and restoration of tidal flushing could revitalize the lagoon as a valuable coastal resource for habitat and some recreational activities. The county has designated it as a regional park.

San Elijo Lagoon has been recognized by the local, State and Federal governments as an outstanding coastal resource. However, it has been threatened by development in and around it. The 1973 completion of Escondido land outfall terminated the daily flow of some 2.5 million gallons of treated sewage effluent into the lagoon from Escondido Creek. This caused substantial drying up of the inner lagoon, which in 1974 lasted into the migratory shorebird nesting season. This also aggravated problems of water stagnation and closing up of the lagoon mouth. The County of San Diego is preparing a management plan for the lagoon which,

when combined with its pending public acquisition, could enhance and protect it. There is also a need to protect the remaining natural hillsides from excessive grading.

The bluffs of the San Dieguito area are extremely fragile, and are subject to severe erosion and sloughing. In some areas, excessive and ill-designed blufftop developments without adequate public beach access have aggravated bluff erosion and failure induced by water and foot traffic.

Based primarily upon their low-density, semi-rural character, the communities of Leucadia and Encinitas and much of Solana Beach have been designated as manmade resources. Additional reasons for these designations are opportunities for pedestrian and bicycle access to the beach, a physical scale consistent with and complementary to coastal landforms, and a physical coherence which adds to the visual attractiveness of the coast. Because of the opportunities for low- and moderate-income housing, Eden Gardens has also been identified as a manmade resource.

The beaches of the San Dieguito subregion offer substantial recreation potential. Anticipated use may be of low or moderate intensity due to the physical barrier created by the coastal bluffs. Because of the desirability of the San Dieguito beaches, the increased population in the North County, and the lack of improved public beach access facilities, the public has carved out foot paths on some of the bluffs, resulting in accelerated erosion. In response to this increasing problem, the Board of Supervisors directed preparation of a comprehensive beach access plan, now completed with approval and implementation pending.

The Regional Commission, hoping to improve access to the San Dieguito Beaches, has designated them for moderate use with intensive nodes located throughout. Two "classic" surfing breaks in this subregion are Sea Cliff County Park and Cardiff Reef.

Before Proposition 20 the San Dieguito area experienced extensive condominium development of its bluff areas. Unfortunately, some of this was not consistent with the established character of the San Dieguito communities. It destroyed the previous sense of openness along the coastal bluffs, and failed to provide phased public access to the adjacent beaches. A case in point is the solid wall of condominium developments along the South Sierra Avenue bluffs in Solana Beach erected over the past seven years.

Other areas under pressure are the lagoon areas and the agricultural lands. To date, the valuable and irreplaceable lagoons have been preserved, although residential marina projects have been proposed. As in other coastal subregions conversion of agricultural lands to urban uses is a continuing and growing problem.

The San Dieguito Community plan, recently adopted after several years of work and debate, makes strong policy statements about the preservation of open space, acquisition and development of parkland, and the protection of resource areas—especially Batiquitos and San Elijo Lagoon. The plan also encourages preservation of the existing pattern of distinct, identifiable communities, separated by lagoons and open spaces.

A potential issue of conflict between the Coastal Plan and the San Dieguito community plan is the importance attached to the preservation of agricultural lands. This is a central concern of the Coastal Plan, and although the San

Dieguito plan discusses the importance of preserving agricultural lands, the plan recommendations and land use map designations do not reflect this same commitment. The county's recently adopted initial growth policy also calls for the preservation of agricultural lands.

Batiquitos and San Elijo Lagoon, the Leucadia/Encinitas business districts, the blufftop areas of the San Dieguito communities, the Cardiff duplex transition area, and the Solana Beach business district have been designated as Special Study Areas. The intent in so designating the lagoons is to coordinate County and State efforts to develop a management program that will guide their long-term protection. Areas in both San Elijo and Batiquitos Lagoons are recommended for priority acquisition. Designation of the blufftop areas of San Dieguito will primarily promote the beach access study prepared by the county engineer, and include it in a beach access plan. The other special study area designations are to ensure the preparation of specific area development plans for these areas of special manmade and natural qualities. Two other designated priority acquisition sites would create extensions of existing State Beach units.

SUBREGION 5: DEL MAR

The Del Mar subregion includes the City of Del Mar and the Torrey Pines community planning area of the City of San Diego, which is made up of Del Mar Heights and Del Mar Terraces. The boundaries extend from Via De La Valle on the north to Carmel Valley on the south. Its inland boundary extends to I-5. The area is characterized by low-density, mostly single-family development. The largest parcels of vacant land include San Dieguito Lagoon and Crest Canyon.

San Dieguito Lagoon, Crest Canyon, and the ocean shoreline and adjacent coastal bluffs are the prime natural habitat and scenic resource areas. From I-5, San Dieguito Lagoon and the lands immediately surrounding it are especially scenic. The State-owned Torrey Pines Reserve Extension also reaches into the southern portion of the subregion. The coastal bluffs of South Del Mar are geologically unstable and susceptible to erosion and landsliding.

The City of Del Mar, $3/4$ square miles in area, is already substantially developed and is one of the most scenic communities in the San Diego Region. Its special mixture of natural and manmade features creates a truly unique visual environment. Development in Del Mar is generally low-profile and small-scale and is located and designed to blend with and complement natural landforms. Because of the low-density character of both its residential neighborhoods and commercial districts and because of the opportunities for pedestrian and bicycle access to the beach, Del Mar has been designated as a special coastal community. The City of Del Mar, has taken steps to ensure that its existing character is retained. A design review board controls all development other than single-family residences and a general plan revision being considered contains ambitious recommendations for open space acquisition. The City of Del Mar has already purchased land for two blufftop parks, one of which has been improved, and in conjunction with the City of San Diego, is planning the purchase of Crest Canyon. The Del Mar Racetrack, based upon its historic and cultural contributions to the community and the region, has also been designated as a manmade resource.

The Del Mar beaches, between San Dieguito Lagoon and 15th Street, are wide and sandy and are suitable for intense recreational use. The beach areas south of 15th Street are more suitable for moderate use because of unstable bluffs over

which there is no convenient access. Because of the relatively scarce public parking, the Del Mar beaches are used predominantly by Del Mar residents. Additionally, signs reading "This Beach for Use by Del Mar Residents" erected by the Del Mar Civic Association have further discouraged the general public's use of Del Mar beaches.

Prior to the passage of Proposition 20, the Torrey Pines community planning area experienced considerable development pressures, with the most obvious result of several large condominium projects on the hills north of Los Penasquitos Lagoon. Currently, the major development activity in Del Mar Heights and Del Mar Terraces is, with the exception of commercial development on Carmel Valley Road, single-family residential. However, several issues of concern have emerged. Most critical has been the encroachment of development on the Torrey Pines Reserve Extension and Crest Canyon. View blockage is also a concern. The commercial development along Carmel Valley Road has raised issues of appropriate land use, building design, landscaping, and impact on the aesthetic and natural character of Los Penasquitos Lagoon.

The Torrey Pines community precise plan, encompassing the areas of Del Mar Heights and Del Mar Terraces, is now in the hearing process. Its foundation is the retention of the residential character of the community and preservation of open space areas. The plan recommends the acquisition of Crest Canyon and additional areas to be made part of the Torrey Pines Reserve Extension.

San Dieguito Lagoon has been designated as a special study area and a prime acquisition site in order to protect and enhance its resource and habitat values. A lagoon management plan should emerge from the special study. The work of the recently established Del Mar Task Force to prepare a lagoon management plan for the San Dieguito Lagoon might well provide the basis for this work. Carmel Valley Road has been designated as a special study area, so that a specific area development plan can be prepared that will take advantage of the positive development potential of this area and to assure that the visual and natural character of Los Penasquitos Lagoon is complemented.

The site of the old Del Mar Hotel and the lands below it to the beach have also be designated as a special study area to ensure that the special amenities of this valuable building site are used in the best interest of the region as a whole.

The coastal bluffs which parallel Del Mar present an opportunity to create a linear park with a coastal trail as a main feature. To investigate this possibility, the Del Mar Bluffs have been designated as a special study area.

SUBREGION 6: TORREY PINES/LA JOLLA

The northern boundary of this subregion includes the Los Penasquitos Lagoon and extends to Carmel Valley Road. The southern boundary approximates the line between La Jolla and Pacific Beach. The inland boundary is I-5. The northern portion of the subregion (Los Penasquitos Lagoon, Torrey Pines Reserve) is undeveloped, while the southern portion (La Jolla) is developed very intensively.

The prime natural resource and habitat areas are Los Penasquitos Lagoon, Torrey Pines State Reserve, the ocean shoreline, coastal bluffs, numerous tide pools, two marine ecological reserves and kelp beds. Los Penasquitos Lagoon has been identified as possessing exceptional coastal lagoon qualities, already documented

in several studies and as having unique educational and research values. Other studies have investigated methods of enhancing the lagoon's tidal prism, thus improving tidal flushing and habitat quality. The Torrey Pines State Reserve protects the very rare Torrey Pine and also includes portions of Los Penasquitos Lagoon. The ocean shoreline includes some of the most beautiful and varied in the San Diego Region: from the wide, sandy beaches of La Jolla Shores to the rocky headlands and pocket beaches of La Jolla, and the high and precipitous bluffs and narrow beaches of Black's Beach. The La Jolla area also possesses many excellent tide pools, such as the Bird Rock area.

La Jolla must also be considered a manmade resource. The distinct manmade qualities of its commercial districts and residential neighborhoods combine to create a coastal community of variety and charm. These attributes attract visitors from San Diego and beyond during all seasons.

A major ingredient of La Jolla's charm is its scenic setting. With hills set back from the shore, many natural promontories exist where the visual amenities of this unique community can be enjoyed. Prime vista areas include Los Penasquitos Lagoon and the ocean from I-5 and old Highway 101. The view of the ocean and downtown area from La Jolla Shores Drive above Scripps Institute, and of course the top of Mt. Soledad, offer unforgettable panoramas.

An additional attraction of the subregion is recreation. La Jolla Shores, along with Mission and Ocean Beaches, consistently has the highest annual attendance figures of the San Diego Region. Wide, sandy beaches, warm and clear water, good surf, and public parking all contribute to the high attendance figures. The pocket beaches of La Jolla offer less intense recreation experiences. Until recently, Black's Beach was sparsely used due to the barrier presented by the high bluffs. Used only by surfers and nude bathers, it offered a relatively remote recreational experience—a truly unique situation considering the proximity to the La Jolla urban complex. However as a result of the publicity given the "free" beach movement, Black's Beach now experiences intense use during summer weekends.

Based upon the variety of use levels the Regional Commission has identified intense, moderate, and low intensity recreational use zones. Several "classic" surfing spots have been designated by the Western Surfing Association. Black's Beach, Wind 'n Sea, and Big Rock are best known.

Blufftop areas above Black's Beach and adjacent to the Salk Institute offer coastal wind currents, and here hang-gliders, soarers, and model airplane enthusiasts compete for the airways. A recently begun planning effort will address major issues for the proposed Torrey Pines City Park on the bluffs above Black's Beach, including improved emergency access to Black's Beach, resolution of use conflicts between hang-gliders, soarers, and model-airplanes, and long-term parking solutions.

Like other coastal communities, La Jolla suffers from critical traffic congestion and parking problems. Exacerbating these are pressures to intensify commercial districts and residential neighborhoods. Although most neighborhoods are stable, a still-existing enclave of older low-income housing is being slowly replaced by higher cost developments. Downtown La Jolla has been undergoing a transition that threatens the charm of the community itself, with small specialty shops and restaurants, which contribute so much to La Jolla's character, being replaced by corporate and financial headquarters.

The adopted La Jolla/La Jolla Shores community plan provides the basis upon which to solve many of La Jolla's problems. Included within the document are well-conceived proposals for residential and commercial design circulation (shuttle service) and improved public access to beach areas.

Special study areas designated are Los Penasquitos Lagoon (where a nuclear power plant is projected by San Diego Gas and Electric Company), Torrey Pines City Park (proposed), and the La Jolla community planning area. A management plan is needed to guide future management and preservation of Los Penasquitos Lagoon. Because of its high resource value, it is recommended that the State Department of Parks and Recreation complete the acquisition of the lagoon for inclusion in the Torrey Pines Reserve. For the proposed park and La Jolla, the intent of the special study area designations is to coordinate the planning of the City of San Diego, La Jollans Inc., other community planning groups, the Regional Commission and successor agency.

SUBREGION 7: PACIFIC BEACH, MISSION BEACH, OCEAN BEACH, MISSION BAY

The land within this subregion is intensively urbanized with predominantly residential and commercial uses. Of the three beach communities, Mission Beach has the highest average density, 33 dwelling units per acre, which is the highest in the City of San Diego. Although certain districts of Ocean Beach and Pacific Beach have equivalent residential densities, other districts are predominantly single-family and bring the average density figures down. Of all the beach communities in the San Diego Region, these three would rank highest in terms of the socio-economic balance of their residents.

Mission Bay Park is a multipurpose recreational resource of regional and state-wide significance, and contains the one major undeveloped parcel of land in the subregion, Fiesta Island. Valuable natural resource areas of the subregion include the ocean beaches and the beaches of Mission Bay. Also of importance are the San Diego rivermouth and floodplain, the Kendall-Frost Preserve in Mission Bay, the very fragile Sunset Cliffs and tidepools, and the Famosa Street Slough.

Manmade resources include Mission Beach and Ocean Beach because of their unique physical, social, and economic character and because they provide pedestrian and bicycle access to the shoreline. As a man-altered environment with substantial recreational value, Mission Bay is also a manmade resource. Belmont Park, a unique regional recreational resource, and Ocean Beach Pier, Vacation Island, and Sea World are also identified as manmade resources to be protected because of their unique functions.

Mission Bay Park is a prime visual resource because of the many vantage points around its perimeter, especially the vistas provided from I-5. Certain sections of Mission Beach, Ocean Beach, and Pacific Beach possess visual amenities, as evidenced by Ocean Front Walk and Bay Front Walk in Mission Beach. The undergrounding of overhead power lines and improvements along Mission Boulevard will do much to improve the visual qualities of Mission Beach.

The three beach communities of this subregion (along with La Jolla Shores in subregion 6) receive the heaviest beach use of the Region. The wide, sandy beaches are of high quality and could well accommodate more use without significantly lowering the quality of the recreational experience. The factor controlling

the level of use of the beaches is the availability of parking or an alternative means of access. Parking has always been insufficient during peak summer weekends, although the new city parking lot across from Belmont Park should help. One possible solution to the access problem, mentioned in the Mission Beach precise plan, would be the initiation of a beach shuttle service from inland parking areas. The Regional Commission, recognizing the existing and potential use levels of the subregion, has designated the beach areas to the Ocean Beach Pier as intensive use zones. Because of their extremely fragile nature, the Sunset Cliffs of Ocean Beach have been designated as a moderate use zone from Ocean Beach pier to Ladera Street, and as a light use zone south of Ladera Street to the Navy Property. The Western Surfing Association has identified 24 "classic" surfing breaks in the Pacific, Mission, Ocean Beach subregion, with the majority in the Sunset Cliffs area.

Mission Bay use varies widely, from intensely used areas such as Crown Point, to the moderate use areas of Fiesta Island. Tourist/commercial recreation is an integral part of the Mission Bay concept. In previous years, commercial development was allowed to restrict lateral public use (access along the beach); however, the City of San Diego has now adopted a policy that would prohibit such development. The City will also reevaluate and revise the Mission Bay Park Plan to ensure maintenance of resource preservation, public access, and recreational quality.

Pacific Beach, Mission Beach, and Ocean Beach share common problems. Development pressures, which are a function of both rising demand for beach-oriented property and property tax increases, are threatening to destroy the physical, social and economic character of the beach communities. Also, as each vacant lot, single-family home, or low-density unit is converted to a multiple-unit complex, already critical density-related problems of traffic and parking congestion will worsen. This, in turn, may further restrict access to the bay and ocean beaches, as graphically demonstrated by the condominium development between Mission Bay and Riviera Beach Drive.

The development standards proposed in the Mission Beach precise plan, already adopted and the Ocean Beach precise plan, still in the hearing process, could go far in preserving the desired characteristics of these communities. However, such standards deal with only the physical aspects of development and can do little about such threats to the desired character of the communities—as market pressures are increasing property taxes. The Mission Beach precise plan suggests several alternatives to the present taxation system; however, the implementation of such alternatives goes far beyond the scope of a community precise plan.

Mission Beach, Ocean Beach, Pacific Beach and Mission Bay have been designated as special study areas by the Regional Commission with the intent being to coordinate and complement the planning efforts of the City of San Diego, community planning groups, the Regional Commission and successor agency. The San Diego rivermouth and Famosa Street Slough have also been designated a special study area. The end product of these special studies would be a management plan to guide the long-term utilization and protection of these resource areas.

SUBREGION 8: POINT LOMA/NORTH ISLAND

This subregion includes the military and other Federal government holdings located on the southern portion of Point Loma (south of Kellogg Street and Point Loma

College), and North Island. The entire subregion consists of Federal lands. Although there are no large parcels of vacant land remaining on North Island, there are significant undeveloped natural areas on Point Loma.

On Point Loma the major resource areas are the Cabrillo National Monument, the entire beach and shoreline area—including tide pools, the last large undisturbed vegetation habitat lands, and a high quality intertidal area off southern Point Loma. Most of the bay frontage of North Island has been reinforced, while the ocean frontage is a wide, sandy beach well suited for intense recreational use.

Other than the historic Point Loma Lighthouse and Cabrillo National Monument area, there are no manmade structures or environments that would meet the criteria for manmade resources. Military installations and the Metro Treatment Plant (with a rated capacity to reach 110 million gallons per day and a 230 MGD ocean outfall, serving most of metropolitan San Diego) are noteworthy manmade features. The finest scenic vista of the San Diego Coast Region is from Cabrillo Monument at the southernmost promontory of Point Loma; it affords an unrivaled panorama of the entire region. Additionally, the point itself must be considered the prominent visual feature and landmark of the Region.

The subregion, if further opened to the public, would have a very high recreational potential. South of Point Loma College, access is restricted by the topography to the extent that the beach can be reached only by boat. Also, military restrictions prohibit public use of this section of shoreline. These barriers have preserved this as one of the few remote stretches of ocean shoreline in Southern California, matched only by portions of Camp Pendleton in the San Diego Region. Sensitive to their immeasurable value as a remote shoreline area, the Regional Commission has designated the Point Loma military lands as a remote recreational use zone. The intent is to encourage the relaxation of military restrictions on public access, which would allow legal access by boat, while still preserving the remote character.

North Island too has a value as a recreational resource, but for entirely different reasons. The North Island ocean beaches are really an extension of the beaches of Coronado. They are wide and sandy, and would be suitable for more recreational use beyond that of military personnel. The Regional Commission, cognizant of North Island's value for public use, has designated its beach areas as intensive use zones.

The military lands of this subregion are not subject to the same development pressures as other areas. North Island is mostly developed, and any expansions, excluding sandy beach areas, would probably not harm coastal resources. Military expansions on Point Loma, however, may very well encroach upon sensitive and valuable lands still in a natural state. When the Coastal Plan is certified by the Federal government under the Coastal Zone Management Act of 1972, most development not directly related to national security will be subject to Coastal Plan policies. Until then cooperation between the State and Federal governments should continue to ensure that unique and irreplaceable resource qualities are not diminished.

Point Loma and North Island are both identified as contingency areas on the Preliminary Plan Map. This means that any military land declared surplus should be retained in public ownership. A special study by the coastal agency should ascertain proper uses and level of use for, with first priority assigned to coast-oriented public uses.

SUBREGION 9: SAN DIEGO CITY BAYFRONT

Boundaries of this urban-oriented subregion are the San Diego River Flood Control Channel to the north, the eastern boundary of the railroad right-of-way including the Santa Fe Depot to the east, San Diego Naval Station to the south, and Coronado City limits to the west. The area is extensively developed, with tourist/commercial use on Harbor and Shelter Islands, aviation-related industries around Lindbergh Field, marine-oriented industrial uses, including National Steel and Shipbuilding, located generally around the Coronado Bridge, and office/commercial uses in the downtown area. The subregion also includes the Marine Corps Recruit Depot, the Naval Training Center, and the Navy Athletic Field.

San Diego Bay and its bayfront are principal natural and manmade resource areas. The Barrio Logan community planning area, because of its opportunities for low- and moderate-income housing, and because of its cultural and historical heritage as a Chicano community, has been designated as a manmade resource.

Based upon recreational value, and opportunities for public access to shore areas, Harbor Island, Shelter Island, Spanish Landing, Broadway Pier, the Embarcadero, and Fish Market have been identified as manmade resources. Also, the Santa Fe Depot, the Star of India, and the Berkeley would be considered manmade resources because of their cultural, historic, and architectural value. Of special visual significance are Harbor Island, Shelter Island, Spanish Landing, the Embarcadero, and Broadway Pier.

This subregion offers recreational opportunities unique to most of the Region. Kellogg Beach is one of few opportunities for water-contact activities such as swimming, but substantial boating facilities exist. The grassy areas of Shelter Island and Spanish Landing provide passive recreational activities such as picnicking and strolling, and fishing is popular.

San Diego Bay's full potential as a recreational resource has not yet been reached, the city and Regional Commission agree. Areas of particularly high potential for public recreation are Navy Field and the site of the old San Diego-Coronado Ferry. These are the last significant open spaces in the immediate area, and should be retained. Plans being prepared for the Embarcadero area by the port and city should enhance public access and enjoyment of this unique area.

Because most land is already developed, the major issue is redevelopment. The City of San Diego is in the early stages of implementing its center city plan. The objectives of this ambitious project are to revitalize and intensify the central business district, and strengthen its role as the commercial, financial, and transportation center of the region. An integral part of the plan is the bayfront, for which the city and port are jointly planning tourist/commercial facilities. Other major center city plan proposals include a marina opposite Navy Field, relocation of naval and non-military facilities such as City Police Headquarters, major bay-related residential developments in the downtown area, and pedestrian transport alternatives to the automobile. Low- and moderate-income housing needs are not addressed in the plan. The San Diego Unified Port District has already divided the bayfront into study areas, identified here as special study areas to facilitate the preparation of specific area plans for the bayfront that will conform with the port master plan and the Coastal Plan.

Preparation of the Barrio Logan community plan is now beginning. The Chicano community is committed to the preservation and improvement of the Barrio. A

principal concern that must be addressed is industrial encroachment into residential areas, since almost the entire community is zoned for industrial and manufacturing uses. Another critical matter is that of bayfront access historically enjoyed by the community but long since eliminated by industrial development. The Barrio has been identified as a special study area so that the city and State can coordinate planning and promote community interests.

Any military lands declared surplus should be retained in public ownership. A special study by the coastal agency should determine the appropriate use and level of use for the lands with highest priority assigned to public recreational use. This same approach should be followed if and when Lindbergh Field is phased out as an airfield, with the Port and Coastal Commission jointly undertaking the study.

SUBREGION 10: CORONADO/SILVER STRAND

The boundaries of this subregion extend to, but do not include, the North Island Naval Air Station to the north, and Imperial Beach City Limits to the south. The eastern boundary runs down the middle of San Diego Bay. The northern portion of the subregion includes the heart of the City of Coronado, already substantially developed. Most of the Silver Strand, including the Naval Amphibious Base, Radio Station, and Silver Strand State Park is in public ownership.

Principal resource areas of this subregion are the San Diego Bay shoreline and tidal mudflats, and the entire ocean beach and shoreline area. Of most concern in this area is the fact that the beaches are losing sand at a rate of approximately one million cubic yards per year, and a natural reversal of the trend is not expected. The southern sections of the beach have suffered the greatest loss, while the beaches north of the Hotel del Coronado have been more stable.

The core area of the City of Coronado, not extending beyond the Hotel del Coronado, has been designated as a special coastal community because of its physical scale, which is consistent with and complementary to coastal landforms; its physical coherence, which adds to the visual attractiveness of the coast for residents and visitors; and its distinctive low-density character. The Hotel del Coronado and the Coronado Bridge have both been identified as manmade resources.

In terms of visual qualities, excellent vistas are offered people traveling across the Coronado Bridge, and driving along Silver Strand on scenic Highway 75.

In spite of the erosion, the beaches here are excellent but underused because they are hard to reach. The roundtrip toll for the Coronado Bridge is \$1.20. Day-use attendance figures at Silver Strand State Beach show it far below capacity. Reinstating the ferry service and allowing bicycles on the Coronado Bridge could improve beach access. The Regional Commission has designated the beach areas for intensive recreational use in an attempt to promote more intensive long-term use. This designation includes the Naval Amphibious Base and the Radio Station, should they be declared surplus or be opened for public use.

The City of Coronado is considering converting an abandoned railroad right-of-way down the middle of Highway 75 into a multipurpose recreational trail, and is promoting a major bayfront park on tidelands property for which the Port of San Diego has proposed a research park.

For the most part, development patterns in the City of Coronado are stabilized

and new development is carefully guided by the adopted general plan and by a City Design Review Board. The current population is 16,000, with a projection of 37,000 for the horizon year of 1990, including completion of the Coronado Shores and Coronado Cays developments.

The City of Coronado is making a concerted effort to meet the adoption deadlines for the State-mandated elements of the general plan. Adoption in 1973 of the environmental resource management element established the community resource base, and recommended as follows on three major issues: (1) On beach erosion, a joint-powers agreement approach to remedial actions and more detailed studies should be used. (2) A proposed second opening to San Diego Bay should be delayed for completion of a detailed environmental impact report. (3) Bay landfill should be allowed only to create open space recreational uses.

Adopted Coastal Plan policies could translate into the following major proposals: (1) Preservation of Coronado as a manmade resource, primarily characterized as a pleasant, low-density residential community. (2) Increase accessibility of beach areas including military beach frontage and provide facilities to encourage more use. (3) Devise and implement a long-term beach sand maintenance program, to provide a permanent solution to beach erosion problems.

SUBREGION 11: SOUTH SAN DIEGO BAY

The boundaries of the South San Diego Bay subregion extend from, and include, the San Diego Naval Station on the north to Palm Avenue on the south. Interstate 5 is the inland boundary, and the midpoint of San Diego Bay is the western boundary. Most of the northern portion is developed, including the San Diego Naval Station and extensive industrial development in National City. The Chula Vista bayfront also has industrial development, including the Rohr Corporation and South Bay Power Plant. A significant portion, primarily the Sweetwater Marsh, is undeveloped and approximately 200 acres are in field tomato and vegetable greenhouse production. Further to the south salt evaporator ponds form the termination of the Otay Valley drainage basin.

The most valuable natural resource area is the Sweetwater Marsh Complex, which includes Paradise Creek. Recognizing the habitat and nesting value of Sweetwater Marsh, the State Department of Fish and Game recommended that it, along with the South Bay salt ponds, be designated a wildlife refuge or ecological reserve. The agricultural lands of the Chula Vista bayfront are valuable as the last remaining agricultural lands in coastal-related production in the immediate area, and do constitute significant open space as well as a partial buffer for the marsh areas.

The South Bay area has a largely untapped potential for serving regional and statewide recreational demands. Two recently built boat launching ramps, one in National City and one in Chula Vista, are not heavily used. The Port District has built short fishing piers and grassy areas for picnics and other passive activities. Some beach areas on the Chula Vista bayfront are suitable for swimming. Several small craft facilities have been proposed. Because of its concern for protecting the remaining marsh habitat areas in the South Bay, especially in the Sweetwater Marsh complex, the California Department of Fish and Game has thus far opposed the marina proposed by National City for the Paradise Creek. This proposal also appears to be in conflict with Coastal Plan policies. The City of Chula Vista has altered its original proposal, and has considered relocating the

marina from the Sweetwater Marsh area to the existing fill surrounding the boat launching ramp. Because the fill already exists, and is shaped to accommodate a marina, this site may be appropriate for a future facility.

A more important issue is the provision of more public access to the bayfront. The Port District's plans for a bicycle path around the bay and Chula Vista's plans for providing and improving public bayfront areas would help meet this end. However, further public commitment is needed to pursue this objective.

Other than the marina proposals, several development projects could adversely impact the wetland habitat and nesting areas in the Sweetwater flood plain and marsh complex. The Corps of Engineers and the Department of Transportation have proposed a joint Sweetwater Freeway (Route 54) and Flood Control Channel, now being revised as a result of public response to the EIS to preserve more wetland areas.

National City, in promoting the industrial use of its holdings west of I-5, has adopted an industrial use policy that gives priority to marine-related and marine-dependent industries and sets forth standards for design and landscaping. The National City redevelopment project is located inland of I-5 and so outside the subregion as presently defined.

The Chula Vista bayfront plan stresses creation of a water-related tourist/commercial resort area. Additional consideration has been given to public open space and recreational areas, and multiple family residential uses. Potential conflicts with the Coastal Plan could evolve over the conversion of lands now in agricultural uses. Also, adopted coastal policies would give residential uses a lower priority than water dependent or tourist/commercial/recreational uses.

Should any land under the jurisdiction of the San Diego Naval Station be declared surplus, it should be retained in public ownership, with use priority going to public recreation.

The Sweetwater Marsh complex has been designated as a priority acquisition site to create a wildlife refuge that would preserve natural habitat and nesting values. Also, a special study on Sweetwater Marsh and the South Bay salt ponds should prepare comprehensive wetland plans to guide future management of these resource areas.

SUBREGION 12: IMPERIAL BEACH/TIA JUANA RIVER VALLEY

Imperial Beach and the Tia Juana River Valley are the southernmost land and water areas of the San Diego Coastal Zone. Imperial Beach is mostly developed with mixed residential and commercial uses with some areas of the immediate shoreline in varying degrees of disrepair. The Tia Juana River Valley, except for agricultural and related uses, is undeveloped, containing one of the State's most valuable coastal estuaries. The Tia Juana Estuary complex serves as an open space buffer between Tijuana and San Diego.

This subregion includes the City of Imperial Beach, the San Diego communities of Nestor and San Ysidro, the U.S. Navy, which has jurisdiction over approximately 1,204 acres at Ream Field, and the State, which manages 655 acres at Border Field State Park. The current population of Imperial Beach is over 21,000, projected to 27,500 by 1990. The urban complex of Imperial Beach, Nestor, San Ysidro, and Tijuana (in Mexico) will reach 1.2 million by 1990.

The Tia Juana Estuary complex, including Oneonta Lagoon, and the land immediately surrounding it is the most valuable natural resource of the subregion. The estuary serves as a habitat for a wide variety of bird and animal species, and has been identified by local, State and Federal agencies as a coastal resource of statewide significance worthy of preservation. An additional resource of significance is the 5,700-acre floodplain, which supports 2,200 acres of agriculture. However, increased land values, taxes, and labor costs have forced most of the farmers to sell their land; today, all but 200 acres are farmed by tenants. The ocean shoreline, although subject to severe erosion problems, must also be considered a primary resource of the subregion. The Corps of Engineers bay dredging project is anticipated to provide 5 million cubic yards of dredge material to replenish Imperial Beach's shore areas.

The planned expansion of Border Field State Park to 2,000 acres will probably necessitate the acquisition of additional Navy property in the event that Ream Field is phased out. In such case, the surplus lands, in accordance with adopted policies of the Coastal Plan, should remain in public ownership with public recreational uses receiving highest priority. Except for a few peak summer Sundays, the area is not heavily used for coastal recreation. In view of the fragile resource areas adjacent to Border Field, such use levels are appropriate, and the Regional Commission has designated the area as a moderate-use recreational zone. However, the shore areas of Imperial Beach have a higher-use tolerance and have been designated for intensive use with the intent of promoting increased recreational use.

The main development pressure within Imperial Beach is for multiple-family development, which would be of concern if provisions are not made to protect and preserve the public access to the beach areas. Imperial Beach redevelopment, the most ambitious development proposal/planning project, calls for the redevelopment and restoration of much of the city's coastal area into beach-related tourist/commercial resort area, with the prime goals being the revitalization of a deteriorated beachfront and the improvement of the local tax base, aesthetics, and public access and use. The proposed highrise development (100 feet) and building locations could achieve compliance with the Coastal Plan. The redevelopment project is auto-dependent and does not consider the provision of alternative modes of transit. With the possibility of relocation of the regional airport to Brown Field, such considerations would be meaningful.

Two other development proposals which would impact Imperial Beach, but would have more direct effects on the river valley and estuary, are for a 500-acre marina and flood control facilities. The marina proposal would entail extensive dredging and filling of Tia Juana Estuary, and would very conceivably be contradictory to preservation policies of the Coastal Plan. The issue of flood control revolves around the extent to which such facilities are needed, and their impact on significant resource and agricultural areas and floodplain management.

In the long term, the San Diego Gas & Electric Company has projected a power plant site on its land east of Border Field. The issues of adverse environmental impact, need for additional generating capacity, and the availability of alternative sites are among those which must be satisfactorily addressed. Additional development pressures and activities within the River Valley that could conceivably be at odds with Coastal policies would be conversion of agricultural lands to urban uses, and sand and mining activities that would remove material that would naturally replenish the subregion's sand-starved beaches.

Based upon the natural resource value of Tia Juana Estuary, it is recommended that it be designated as a special study area and a priority acquisition site. Preparation of a management plan would guide future use in accordance with estuarine preservation, and acquisition would aid in the ultimate preservation and protection of the natural and aesthetic character of the estuary and its buffer area.

The redevelopment project, and the development of that area extending south along First Street toward the estuary, would benefit from preparation of a specific area plan addressing the issues of appropriate densities, public access, urban design, and alternatives to the automobile.

NORTH COAST RESOURCE MAP SUPPLEMENTAL NOTES

DEL NORTE AND NORTHERN HUMBOLDT COUNTY

Significant Coastal Wetlands and Estuaries*

1. Smith River Flood Plain
2. Yontocket Slough; ponds in Sections 4, 5, 8, and 9 of T17N, R1W; Tryon Creek
3. Talawa Slough; Lake Talawa and creeks that drain into it; Lake Earl and creeks that drain into it; McLaughlin Pond; logging ponds in Sections 8 and 9 of T16N, R1W
4. Dead Lake and Adjacent ponds
5. Wetlands in Sections 24, 34, and 35 of T16N, R1W; wetlands in Sections 2 and 11 of T15N, R1W (Cushing Creek and north along coast)
6. Wilson Creek
7. Mill pond
8. Klamath River mouth and flood plain
9. Marsh in Section 9, T11N, R1W, W $\frac{1}{2}$, NW $\frac{1}{4}$

Coastal Streams with Good Riparian Habitat*

1. Gilbert Creek
2. Lopez Creek
3. Mill Creek (empties into Smith River Section 8, T17N, R12W)
4. Johnson Creek
5. Ossagon Creek
6. Butler Creek
7. Boat Creek
8. Home Creek
9. Squashan Creek
10. Pond and stream at Gold Bluff
11. Major Creek

* Wetlands, estuaries and coastal streams are numbered consecutively from north to south. More precise locations of these resources are identified on maps at a scale of 1:62,500 in the North Coast Regional office and in the Statewide office of the Coastal Commission.

NORTH COAST PLAN MAP SUPPLEMENTAL NOTES

DEL NORTE COUNTY COASTAL BEACH PARKS AND ACCESS

County Parks and Access

Clifford Kamph Memorial Park
Mouth of Smith River Access
Pala Park
Kellogg Road Beach Access
Point St. George Beach Access
Pebble Beach Access

Crescent City Parks and Access

North Beach
Pebble Beach
South Beach
and numerous smaller access facilities

State Parks and Beaches

Pelican State Beach
Del Norte Coast Redwoods State Park

Federal Areas

Redwoods National Park

Offshore Rocks

Hunter Rock
Prince Island
Castle Island
False Klamath Rock
Redding Rock

NORTH COAST RESOURCE MAP SUPPLEMENTAL NOTES

HUMBOLDT COUNTY

Significant Coastal Wetlands and Estuaries*

- | | |
|--|--|
| 1. Redwood Creek flood plain | 15. Marsh and oxidation pond in Sections 31 and 32, T6N, R1E, and Sections 5 and 8, T5N, R1E |
| 2. Freshwater Lagoon | 16. Gunther Island, Woodley Island, Daby Island and marsh in Sections 23 and 24, T5N, R1W |
| 3. Stone Lagoon | 17. Marsh and ponds in Sections 29 and 32, T5N, R1W |
| 4. Dry Lagoon | 18. Marsh, Section 28, T5N, R1W |
| 5. Big Lagoon and associated marshes | 19. Elk River and adjacent marsh, Sections 4 and 5, T5N, R1W |
| 6. Little River flood plain | 20. Marsh, Sections 7, 8 and 17, T4N, R1W |
| 7. Clam Beach ponds | 21. Marsh, Section 26, T4N, R1W and Hookton Slough flood plain |
| 8. Wetland at mouth of Widow White Creek, Section 5, T7N, R1W | 22. Eel River flood plain west of Centerville Road |
| 9. Wetland in T7N, R1W, Section 36 and Section T6N, R1W; Mad River flood plain | 23. Bear River |
| 10. Essex Pond and adjacent marsh | 24. Mattole River |
| 11. Marsh in Section 16, T6N, R1E | |
| 12. Humboldt Bay | |
| 13. Mad River Slough | |
| 14. Marsh and ponds in Sections 3 and 10 of T5N, R1W | |

Coastal Streams with Good Riparian Habitat*

- | | |
|---|--|
| 1. Skunk Cabbage Creek | 23. Mill Creek |
| 2. Johnson Creek | 24. McConnahas Creek |
| 3. Redwood Creek | 25. Dead Man's Creek |
| 4. Prairie Creek and tributary | 26. Luffenholtz Creek |
| 5. No Name Creek, T11N, to southeast of Redwood Creek | 27. Eighteen Creek |
| 6. Freshwater Lagoon and streams leading into it | 28. Little River and South Fork Little River |
| 7. Stone Lagoon | 29. Coon Creek |
| 8. McArthur Creek | 30. Bullwinkle Creek |
| 9. Elan Creek | 31. Ponds along highway by Clam Beach |
| 10. Dry Lagoon | 32. Grassy Creek |
| 11. McDonald Creek | 33. Patrick Creek |
| 12. Tom Creek | 34. Strawberry Creek |
| 13. Diamond Creek | 35. West White Creek |
| 14. Big Lagoon | 36. Mill Creek |
| 15. Gray Creek | 37. Mad River Slough |
| 16. Maple Creek and north fork Maple Creek | 38. Liscom Slough |
| 17. Pitcher Creek | 39. Jacoby Creek |
| 18. Penn Creek | 40. Washington Gulch Creek |
| 19. Beach Creek | 41. Fay Slough |
| 20. Burris Creek | 42. Freshwater Slough and Creek |
| 21. Savage Creek | 43. Ryan Creek Slough |
| 22. McNeil Creek | 44. Singley Creek |
| | 45. McNut Gulch |

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NORTH COAST PLAN MAP SUPPLEMENTAL NOTES

HUMBOLDT COUNTY COASTAL BEACH PARKS AND ACCESS

County Parks and Access

Redwood Creek
Big Lagoon
Luffenholtz
Clam Beach Park
Mad River Park
Samoa Boat Ramp
Fields Landing Boat Ramp
Table Bluff
Pedrazzini County Park
Centerville Beach

City of Eureka Parks and Access

Samoa Airpark Recreational Area
Bay Access (adjacent to Samoa Boat Ramp)

State Parks and Beaches

Prairie Creek Redwood State Park
Dry Lagoon State Park
Patrick's Point State Park
Trinidad State Beach
Little River State Beach

Federal Areas

Redwoods National Park
King Range National Conservation Area

Offshore Rocks

White Rock
Green Rock
Flatiron Rock
Pilot Rock
Little River Rock
False Cape Rock
Sugarloaf Rock
Steamboat Rock

NORTH COAST RESOURCE SUPPLEMENTAL NOTES

MENDOCINO COUNTY

Significant Coastal Wetlands and Estuaries *

- | | |
|--|--|
| 1. Usal Creek | 14. Big River |
| 2. Cottoneva Creek | 15. Little River |
| 3. Hardy Creek | 16. Albion River |
| 4. Juan Creek | 17. Little and Big Salmon Creek |
| 5. Howard Creek mouth | 18. Navarro River |
| 6. DeHaven Creek mouth; Wages Creek | 19. Greenwood Creek |
| 7. Ten Mile River | 20. Elk Creek |
| 8. Inglenook Creek and Fen | 21. Alder Creek |
| 9. Sandhill Lake Section, 17, T19W, R17W | 22. Wetlands in middle of Section 13, T13N, R17W |
| 10. Lake Cleone | 23. Brush Creek |
| 11. Pudding Creek | 24. Hunter's Lagoon |
| 12. Noyo River | 25. Garcia River; Hathaway Creek |
| 13. Caspar Creek | 26. Gualala River |

Coastal Streams with Good Riparian Habitat*

- | | |
|---|------------------------------|
| 1. Cottoneva Creek | 14. Salmon and Little River |
| 2. Hardy Creek; Juan and Little Juan Creeks | 15. Navarro River |
| 3. DeHaven Creek; Wages Creek | 16. Greenwood Creek |
| 4. Ten Mile River | 17. Elk Creek |
| 5. Pudding Creek | 18. Mallo Pass Creek |
| 6. Hare Creek | 19. Irish Creek |
| 7. Jughandle Creek | 20. Alder Creek |
| 8. Caspar Creek | 21. Brush Creek |
| 9. Russian Gulch | 22. Point Arena Creek |
| 10. Jack Peters Creek | 23. Mote Creek |
| 11. Big River | 24. Schooner Gulch |
| 12. Little River | 25. Big Gulch |
| 13. Buckhorn Creek | 26. North Fork Gualala River |
| | 27. Gualala River |

* Wetlands, estuaries and coastal streams are numbered consecutively from north to south. More precise locations of these resources are identified on maps at a scale of 1:62,500 in the North Coast Regional office and in the Statewide office of the Coastal Commission.

NORTH COAST PLAN MAP SUPPLEMENTAL NOTES

MENDOCINO COUNTY COASTAL BEACH PARKS AND ACCESS

County Parks and Access

South Kibesillah Gulch Access
Seaside Beach Access
Heeser Drive Beach Access
Navarro Beach Access

City of Fort Bragg

(none at the present time)

State Parks and Beaches

Westport Union Landing State Beach
Mac Kerricher State Park
Casper Headlands State Park
Russian Gulch State Park
Mendocino Headlands State Park
Van Damme Beach State Park
Manchester Beach State Park

Federal Areas

(none at the present time)

Offshore Rocks

Cape Vizcanio
Goat Island
Devils Basin Rock
White Rock
Fish Rock
Point Arena Rock

NORTH CENTRAL COAST RESOURCE MAP SUPPLEMENTAL NOTES

SUPPLEMENTAL MAP NOTES

1. Designated timberlands are approximate and do not differentiate between commercial and non-commercial timberlands.
2. Landslide and slope stability information is not yet available for:
(a) Sea Ranch subdivision; (b) Jenner Bay subdivision; (c) Bodega Harbour subdivision; (d) all state Parks in Sonoma County; (e) area on the east side of Tomales Bay from Marin County Line south to Pt. Reyes Station; (f) area between Stinson Beach and the Golden Gate.

PRINCIPAL RESOURCE MAP INFORMATION SOURCES

Asso. of Bay Area Governments: Ocean Coastline Study

Department of Navigation and Ocean Development: California Comprehensive Ocean Area Plan; Appendices 3,4,5,7, & 9

California Division of Forestry: Soil-Vegetation Maps

U.S. Geological Survey: (a) Atlas of Urban & Regional Change (EROS program); (b) Flood Prone Areas-Water Resources Investigation 3773; (c) Tsunami Imundation, MF-480; (d) various geologic reports & papers

U.S. Soil Conservation Service: County soil surveys

California Department of Parks & Recreation: California Coastline Preservation and Recreation Plan

California Department of Fish & Game: Fish & game reference material

California natural areas coordinating council: A Selected Listing of Natural Areas of California, 1974

County of Marin: (a) The Marin County Wide Plan; (b) Agriculture Preserve Map

County of Sonoma: (a) Environmental Resources Management, Volume 1&2; (b) Geology for Planning on the Sonoma Coast, Preliminary Reports 16 & 20

NORTH CENTRAL PLAN MAP SUPPLEMENTAL NOTES

1. Preclude further subdivision and purchase or consolidate lots as necessary at Sea Ranch to reduce planned level of growth consistent with capacity budgets for Highway 1 and Skaggs Springs Road. Encourage home rental program. Acquire several undeveloped subdivision units (e.g., Units 34 and 8) for view protection and day-use facilities. Utilize environmental deposit fund to accomplish established overall conditions.
2. Establish population holding capacity for Bodega Bay at 700 persons to retain scale and character of coastal fishing village. Develop additional campsites and commercial visitor accommodations to approximately double current facilities. Provide additional berthing facilities for commercial fishing fleet only, but special area plan should establish ultimate number of vessels to be berthed in Bodega Harbor. U.C. Marine Lab to remain a modest sized research facility rather than a classroom campus. Development at the Bodega Harbour subdivision should be limited to a maximum of 500 units, with preference in additional development given to lodge facilities.
3. Increase design speed, capacity and signing of Lucas Valley-Point Reyes Station Road to provide main access to campgrounds and trails in Golden Gate National Recreation Area and Point Reyes National Seashore and also to relieve current heavy demands on Sir Francis Drake Boulevard, Panoramic and Highway 1. Improvements to Panoramic Highway should emphasize transit access over expanded auto facilities, but would provide a major access route to ridgetop trailheads in the GGNRA. Minimal improvements to Highway 1 should be limited to correction of safety problems.
4. Acquire sandy beach along entire length of the Seadrift spit from dunes to public dunes to public tidelands, as well as beach and dune area along Mira Vista Avenue in Stinson Beach, for addition to the adjacent Golden Gate National Recreation Area. Develop parking facilities and rest rooms to serve north end of beach.
5. Limit further residential development at Bolinas, Stinson Beach and Muir Beach to presently subdivided lots and historic growth rate. Establish several additional modest-sized visitor facilities in the two larger villages. In Muir Beach, visitor facilities must be quite small to maintain scale with existing structures. Continue construction moratorium at Stinson Beach until construction of community sewerage solution.
6. Commercial recreation should be provided (but severely restricted) at the Cliff House site; commercial recreation facilities of an intense, urban nature should be developed on the southerly two blocks of the Playland site. The northerly block should be acquired for addition to GGNRA.
7. Limit further development of all open lands around Lake Merced to non-structural recreational facilities open to the general public. The existing police facilities and shooting range should be phased out. Protect fragile areas of Fort Funston from overuse, with no development of major facilities.

CENTRAL COAST RESOURCE MAP SUPPLEMENTAL NOTES

Those wetlands and estuaries within the Central Coast Region are as follows:

San Mateo County

- | | |
|-----------------------------|-----------------------------|
| 1. Laguna Salada | 5. San Gregorio Creek Mouth |
| 2. Princeton Marshes | 6. Cascade Creek Marshes |
| 3. Pillarcitos Creek Lagoon | 7. Green Oaks Marsh |
| 4. Tunitas Creek Mouth | 8. Pescadero Marsh |

Santa Cruz County

- | | |
|---|---------------------------|
| 1. Waddell Creek Mouth | 13. White's Lagoon |
| 2. Scott Creek Marsh | 14. Buzzard Lagoon |
| 3. Laguna Creek Marsh | 15. Valencia Lagoon |
| 4. Baldwin Creek Marsh | 16. Ellicott Station Pond |
| 5. Wilder Creek Lagoon | 17. Corralitos Lagoon |
| 6. Younger Lagoon (Terrace Point Research Site) | 18. Pinto Lake |
| 7. Moore Creek Lagoon | 19. Watsonville Slough |
| 8. Neary's Lagoon | 20. Kelly Lake |
| 9. Upper Wood's Lagoon | 21. Drew Lake |
| 10. Schwan Lake | 22. Lake Tynan |
| 11. Corcoran Lagoon | 23. Bonita Lagoon |
| 12. Moran Lake | 24. Harkins Slough |
| | 25. Black Point Lagoon |

Monterey County

1. Elkhorn Slough System (including Bennett Slough, Moro Cojo Slough, Tembladero Slough, and McClusky Slough)
2. San Miguel Pond
3. Espinosa Lake
4. Salinas River Mouth Estuary (including Ponds and Old Salinas River)
5. Marina vernal ponds (#1 through #6 and #9 through #11 as defined in Marina Freeway Environmental Report of November, 1973)
6. Laguna Del Rey (including "Robert's Lake")
7. Del Monte Lake
8. El Estero
9. Crespi Pond
10. Lake Majella
11. Carmel River Estuary
12. Little Sur Lagoon
13. Point Sur vernal ponds
14. Big Sur River Mouth

SOURCE OF MAP INFORMATION

1. Generalized Vegetation Cover (California Region). Compiled from USGS California State Map 1:500,000
2. Composite Seismic Hazards of the Central Coast Region. Compiled by USGS for Central Coast Commission Central California 1:200,000
3. A Selected Listing of the Natural Areas of California. Compiled by the California Natural Areas Coordinating Council, October, 1974 (In Cooperation with State of California Office of Planning and Research)
4. At the Crossroads (A Report on California's Endangered and Rare Fish and Wildlife, 1972-74)
5. California Coastline Preservation and Recreation Plan. The Resources Agency Department of Parks and Recreation, 1971

CENTRAL COAST PLAN MAP SUPPLEMENTAL NOTES

Outstanding Landmarks, Natural Areas, Historic Areas, and Prominent Landforms (Not currently under scenic protection) (A)

Mori Point
Mussel Rock
San Pedro Rock
Montara Light Station
Pillar Point
Pigeon Point and Lighthouse
Ano Nuevo Lighthouse
Sand Hill Bluff
Point Santa Cruz and eastern part of Lighthouse Field
Arana Gulch
Elkhorn Slough
Point Pinos and Lighthouse
San Jose Creek canyon
Bixby and Rocky Creek bridges
Little Sur River gorge
Los Padres National Forest
Pico Blanco
Point Sur and Lighthouse
Victorian era houses: Santa Cruz, Watsonville, Pacific Grove
Historic railroad depots, Ocean Shore and Southern Pacific RRs

Scenic Road Corridors (A)

Highway 35 and 1 (continuous)
Pescadero Road
Bean Hollow Road - State Road
Swanton Road - Davenport Landing Road
West Cliff Drive, Santa Cruz
Riverside Drive (State 129)
Pajaro Coast Scenic Drive
San Andreas Road
McGowan Road
Trafton Road
Bluff Road
Jensen Road
Elkhorn Road - Castroville Blvd.
Monterey Peninsula Scenic Drive
Lighthouse Avenue
Cannery Row
Oceanview Blvd.
Sunset Drive
Seventeen Mile Drive
Scenic Road
Carmel Valley Road
Old Coast Road
(Bixby Canyon - Bir Sur River)
Sycamore Canyon Road

Special Marine and Wetland Environments

(Preclude development with adverse impacts - M)

James V. Fitzgerald Marine Reserve
Pescadero Creek and Marsh
Ano Nuevo Marine Reserve and Creek
Terrace Point and Moore Creek Lagoon
Elkhorn Slough System
Hopkins and Pacific Grove Marine Refuges
Carmel Bay
Point Lobos State Reserve
California Sea Otter Game Refuge

High Priority Public Management Areas (I)

Daly City bluffs
Pacifica beaches and headlands
Fitzgerald Marine Reserve undeveloped uplands
San Mateo Midcoast Beaches
Pescadero Marsh
Davenport Landing
Scott Creek
Natural Bridges Park
Lighthouse Field
San Lorenzo River Mouth
Santa Cruz Harbor (adjacent lands)
Pajaro Coast Beaches
Elkhorn Slough (adjacent lands)
Dunes and Beaches west of Highway 1 (Marine to Monterey)
Big Sur beaches, upland support areas, highway viewshed

Special Coastal Neighborhoods (I)*

Skyline area (Daly City)	
West Pacific Manor	
West Sharp Park	Pacifica
Rockaway Beach	
Pedro Point/Shelter Cove	
Princeton	
Miramar	
Pescadero	
Davenport	
Lighthouse Point	
Beach Hill	Santa Cruz
East Side	
Capitola Village	
Moss Landing	
West Marina	
Fisherman's Wharf	Monterey
Cannery Row	
Pacific Grove	
Pebble Beach	
Carmel	

Areas of Outstanding Scenic Quality (A) (Historic Districts and Landscape Preservation Projects)

Pescadero
Ano Nuevo
Natural Bridges
Monterey Bay Dunes
Asilomar
Pt. Lobos
Big Sur
Monterey Historic District
Mission San Carlos Borromeo
Mission Santa Cruz
Sweeney Ridge

Legend

M - Marine Environment	R - Recreation
L - Coastal Land Environment	E - Energy
G - Geology	T - Transportation
A - Appearance and Design	I - Intensity of Development

CENTRAL COAST RESOURCE MAP SUPPLEMENTAL NOTES

Those wetlands and estuaries within the Central Coast Region are as follows:

San Mateo County

- | | |
|----------------------------|-----------------------------|
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| 2. Princeton Marshes | 6. Cascade Creek Marshes |
| 3. Pilarcitos Creek Lagoon | 7. Green Oaks Marsh |
| 4. Tunitas Creek Mouth | 8. Pescadero Marsh |

Santa Cruz County

- | | |
|---|---------------------------|
| 1. Waddell Creek Mouth | 13. White's Lagoon |
| 2. Scott Creek Marsh | 14. Buzzard Lagoon |
| 3. Laguna Creek Marsh | 15. Valencia Lagoon |
| 4. Baldwin Creek Marsh | 16. Ellicott Station Pond |
| 5. Wilder Creek Lagoon | 17. Corralitos Lagoon |
| 6. Younger Lagoon (Terrace Point Research Site) | 18. Pinto Lake |
| 7. Moore Creek Lagoon | 19. Watsonville Slough |
| 8. Neary's Lagoon | 20. Kelly Lake |
| 9. Upper Wood's Lagoon | 21. Drew Lake |
| 10. Schwan Lake | 22. Lake Tynan |
| 11. Corcoran Lagoon | 23. Bonita Lagoon |
| 12. Moran Lake | 24. Harkins Slough |
| | 25. Black Point Lagoon |

Monterey County

1. Elkhorn Slough System (including Bennett Slough, Moro Cojo Slough, Tembladero Slough, and McClusky Slough)
2. San Miguel Pond
3. Espinosa Lake
4. Salinas River Mouth Estuary (including Ponds and Old Salinas River)
5. Marina vernal ponds (#1 through #6 and #9 through #11 as defined in Marina Freeway Environmental Report of November, 1973)
6. Laguna Del Rey (including "Robert's Lake")
7. Del Monte Lake
8. El Estero
9. Crespi Pond
10. Lake Majella
11. Carmel River Estuary
12. Little Sur Lagoon
13. Point Sur vernal ponds
14. Big Sur River Mouth

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4. At the Crossroads (A Report on California's Endangered and Rare Fish and Wildlife, 1972-74)
5. California Coastline Preservation and Recreation Plan. The Resources Agency, Department of Parks and Recreation, 1971

CENTRAL COAST PLAN MAP SUPPLEMENTAL NOTES

Outstanding Landmarks, Natural Areas, Historic Areas, and Prominent Landforms (Not currently under scenic protection) (A)

Mori Point
Mussel Rock
San Pedro Rock
Montara Light Station
Pillar Point
Pigeon Point and Lighthouse
Ano Nuevo Lighthouse
Sand Hill Bluff
Point Santa Cruz and eastern part of Lighthouse Field
Arana Gulch
Elkhorn Slough
Point Pinos and Lighthouse
San Jose Creek canyon
Bixby and Rocky Creek bridges
Little Sur River gorge
Los Padres National Forest
Pico Blanco
Point Sur and Lighthouse
Victorian era houses: Santa Cruz, Watsonville, Pacific Grove
Historic railroad depots, Ocean Shore and Southern Pacific RRs

Scenic Road Corridors (A)

Highway 35 and 1 (continuous)
Pescadero Road
Bean Hollow Road - State Road
Swanton Road - Davenport Landing Road
West Cliff Drive, Santa Cruz
Riverside Drive (State 129)
Pajaro Coast Scenic Drive
San Andreas Road
McGowan Road
Trafton Road
Bluff Road
Jensen Road
Elkhorn Road - Castroville Blvd.
Monterey Peninsula Scenic Drive
Lighthouse Avenue
Cannery Row
Oceanview Blvd.
Sunset Drive
Seventeen Mile Drive
Scenic Road
Carmel Valley Road
Old Coast Road
(Bixby Canyon - El Sur River)
Sycamore Canyon Road

Special Marine and Wetland Environments

(Preclude development with adverse impacts - M)

James V. Fitzgerald Marine Reserve
Pescadero Creek and Marsh
Ano Nuevo Marine Reserve and Creek
Terrace Point and Moore Creek Lagoon
Elkhorn Slough System
Hopkins and Pacific Grove Marine Refuges
Carmel Bay
Point Lobos State Reserve
California Sea Otter Game Refuge

High Priority Public Management Areas (I)

Daly City bluffs
Pacifica beaches and headlands
Fitzgerald Marine Reserve undeveloped uplands
San Mateo Midcoast Beaches
Pescadero Marsh
Davenport Landing
Scott Creek
Natural Bridges Park
Lighthouse Field
San Lorenzo River Mouth
Santa Cruz Harbor (adjacent lands)
Pajaro Coast Beaches
Elkhorn Slough (adjacent lands)
Dunes and Beaches west of Highway 1 (Marine to Monterey)
Big Sur beaches, upland support areas, highway viewshed

Special Coastal Neighborhoods (I)*

Skyline area (Daly City)	
West Pacific Manor	
West Sharp Park	Pacifica
Rockaway Beach	
Pedro Point/Shelter Cove	
Princeton	
Miramar	
Pescadero	
Davenport	
Lighthouse Point	
Beach Hill	Santa Cruz
East Side	
Capitola Village	
Moss Landing	
West Marina	
Fisherman's Wharf	Monterey
Cannery Row	
Pacific Grove	
Pebble Beach	
Carmel	

Areas of Outstanding Scenic Quality (A)

(Historic Districts and Landscape Preservation Projects)

Pescadero
Ano Nuevo
Natural Bridges
Monterey Bay Dunes
Asilomar
Pt. Lobos
Big Sur
Monterey Historic District
Mission San Carlos-Borromeo
Mission Santa Cruz
Sweeney Ridge

Legend

M - Marine Environment	R - Recreation
L - Coastal Land Environment	E - Energy
G - Geology	T - Transportation
A - Appearance and Design	I - Intensity of Development

SOUTH CENTRAL COAST RESOURCE MAP SUPPLEMENTAL NOTES

Additional Legend to Coastal Resources Map

- D Diving: Popular scuba areas
- ▲ State Parks and Major Local Parks

Wetlands

- San Carpoforco Creek Estuary
- Pico Creek Estuary
- San Simeon Creek Estuary
- Santa Rosa Creek Estuary
- Morro Bay Estuary
- San Luis Obispo Creek Estuary
- Arroyo Grande Estuary
- Santa Maria River Estuary

Special Marine Habitats

- California Sea Otter Refuge: Continuing southward from Central Coast to Cambria
- Seal Rookeries: From Point San Luis
- Tide Pools: Cayucos

Grazing

Grazing Areas were determined from air photos at a scale of 1:120,000

Anadramous Fish Streams

- San Carpoforco Creek
- Arroyo de la Cruz
- Little Pico Creek
- Pico Creek
- San Simeon Creek
- Santa Rosa Creek
- San Luis Obispo Creek
- Toro Creek

Unavailable Information

The 100-year flood plain and seismic risk areas for San Luis Obispo County coastline were not available at time of printing.

SOUTH CENTRAL COAST RESOURCE MAP SUPPLEMENTAL NOTES

Additional Legend to Coastal Resources Map

- S Surfing: Classic Surfing areas
- D Diving: Popular scuba areas
- ▲ State Parks and Major Local Parks

Wetlands

Santa Ynez River Estuary
Campus Lagoon
Goleta Lagoon
Devereux Slough
El Estero

Special Marine Habitats

Coastal Bluff Intertidal Preserve: From Point Conception to Ellwood
Naples Reef
Coal Oil Point Natural Reserve
Carpinteria Intertidal Zone

Grazing

Grazing Areas were determined from air photos at a scale of 1:120,000

SOUTH CENTRAL COAST RESOURCE MAP SUPPLEMENTAL NOTES

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- D Diving: Popular scuba areas
- ▲ State Parks and Major Local Parks

Wetlands

Ventura River Mouth
Santa Clara River Mouth
McGrath Lake
Mugu Lagoon

Special Marine Habitats

Mugu Submarine Canyon
Hueneme Submarine Canyon
Area of Special Biological Significance: Point Mugu to Ventura County line

Grazing

Grazing Areas were determined from air photos at a scale of 1:120,000

Unavailable Information

Hazard information was not available at time of printing for the Channel Islands.

SOUTH COAST PLAN MAP SUPPLEMENTAL NOTES

DEVELOP CANYON, RIDGELAND, COASTAL TRAILS

Potential Trail Locations

Subregion 1: Arroyo Sequit, Zuma Canyon, Escondido Canyon, Corral Canyon, Malibu Canyon, Winter Canyon, Carbon Canyon, Tuna Canyon, Topanga Canyon, and Coastal and Ridge trail segment to connect parks.

6: Harbor Trail.

11 and 12: Trail development in the San Joaquin Hills, and hill areas above Laguna and South Laguna.

Potential Flood Control Channel Trails

Los Angeles River, San Gabriel River,
Santa Ana River

Biologically Important Areas [Set aside adequate acreage at each site to assure genetic health of the flora and fauna (Plan map - [stippled])]

Subregion 1: Zuma Canyon and Watershed; Malibu Lagoon, Canyon and Watershed; Tuna Canyon and Watershed; Rustic and Sullivan Canyons; Santa Ynez; Temescal Canyons and Watershed

2: Ballona Creek.

3: Airport Dunes.

4: Madrona Marsh.

5: Palos Verdes Coast, Portuguese Bend Landslide Area, Bent Spring Canyon, Malaga Canyon, Aqua Amarga Canyon, Rolling Hills Canyon.

6: Terminal Island Site, Harbor Park, and Bixby Slough.

7: San Gabriel River Mouth, North Bank.

8: San Clemente Island-Canyons, seal and sea lion breeding areas; Santa Catalina-Areas to include Cherry Valley, Blackjack Mountain, Middle and Bulrush Canyons, Seal Rocks, Bird Rock, Indian Rock and Salta Verde.

9: Anaheim Bay, Bolsa Bay and Golden West Ponds.

10: Newport Marina, Upper Newport Bay, Bluffs, and Big Canyon and San Joaquin Marsh.

11: Pelican Hill, San Joaquin Hills.

12: Laguna Lake and Watershed; Aliso Creek and Watershed; South Laguna Hills, Wood Canyon, Niguel Lake.

13: San Juan River Mouth.

Fault Zones [recommended for study under the Alquist-Priolo Geologic Hazards Zone Act]

Newport-Inglewood
Santa Monica-Malibu
Palos Verdes

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Newport-Inglewood
Santa Monica-Malibu
Palos Verdes

SAN DIEGO REGION RESOURCE MAP SUPPLEMENTAL NOTES

COASTAL WETLANDS AND ESTUARIES

Wetlands

San Mateo Marsh
Los Flores Marsh
San Luis Rey River
Loma Alta Slough
Canyon de los Encinas Marsh
Soledad Creek
Mission Bay Marsh Reserve
Famosa Street Slough
San Diego River Flood Control Channel Marsh
Marshes & Mudflats of South San Diego Bay

Estuaries

- * Santa Margarita Marsh
- Buena Vista Lagoon
- * Agua Hedionda Lagoon
- * Batiquitos Lagoon
- * San Elijo Lagoon
- * San Dieguito Lagoon
- Los Penasquitos Lagoon
- Deep water portions of Mission Bay
- Deep water portions of San Diego Bay
- * Tia Juana Estuary Complex (inc. Oneonta Lagoon)

* NOTE:

Lagoon systems designated to be retained in, or restored to tidal action. (San Diego Coast Regional Commission Marine Environment policy # 2; State Commission Marine Environment policy # 2-regional amp.).

ADDITIONAL SIGNIFICANT AREAS (UNMAPPED)

Tidepool Areas:

1. San Mateo Point Area
2. Torrey Pines Area
3. Scripps Pier Area
4. Point La Jolla Area
5. Windansea Beach Area
6. Bird Rock Area
7. False Point Area
8. Mariners Point Area
9. Ocean Beach Municipal Pier Area
10. Sunset Cliffs Area
11. Point Loma Area

Littoral Cells:

1. Oceanside
2. Mission/Ocean Beach
3. Silver Strand

Pocket Beach Areas:

1. La Jolla
2. Point Loma

Unstable Bluff Areas:

1. San Onofre
2. Leucadia/Encinitas
3. Del Mar
4. Torrey Pines
5. La Jolla
6. Sunset Cliffs - Point Loma

MAP NOTES:

- Areas of potential hazard to public safety include floodplains only, due to inconsistency in other hazard information at time of printing.
- Grazing lands have not been delineated within agricultural areas due to inconsistency in information at time of printing.
- Due to the characteristically small scale of coastal floriculture, some important sites within urban areas have been excluded.

MAJOR SOURCES:

San Diego Comprehensive Planning Organization, Initial Coastline Plan, 1974, and Open Space Study, 1974.
Conrock Corporation. San Diego County Agricultural Advisor's Office. Western Surfing Association.

HABITAT AREAS:

1. Banks of the San Mateo Creek. Grassland and riparian woodland. 2,300 acres of the valley have been leased from Camp Pendleton by the California Department of Parks and Recreation for camping and wildlife reserve.
2. Banks of San Onofre Creek. Riparian woodland.
3. San Onofre Bluffs and Camp Pendleton Coast from Las Flores Marsh to Oceanside West of I-5. Grassland.
4. Camp Pendleton Coast from Japanese Mesa to Las Flores Marsh East Side of I-5. Coastal sage.
5. Mouth of Las Flores Creek. Coastal sage.
6. Mouth of Santa Margarita Creek. Coastal sage. Nesting site for two endangered species, California least tern and Belding's savannah sparrow.
7. Mouth of San Luis Rey River. Grassland. Existing wildlife has been substantially decreased by urban development.
8. Land Surrounding Buena Vista Lagoon. A small riparian community upstream from the lagoon and on the southeast perimeter.
9. Land Surrounding Agua Hedionda. Coastal sage except on the north shore where development has replaced vegetation. At the extreme east end, there is a several acre marsh with riparian vegetation.
10. Land Surrounding Batiquitos. Coastal sage south side, grassland north and east side, riparian southern perimeter.
11. Encinas Canyon. Riparian.
12. Encinitas Boulevard Canyon. Coastal sage.
13. Cardiff Canyon. Coastal sage.
14. Land Surrounding San Elijo. Coastal sage and grassland.
15. Lux Canyon. Riparian.
16. San Dieguito Valley. Coastal sage and grassland.
17. Gonzales Canyon. Coastal sage.
18. Carmel Valley. Woodland on northeast side.
19. Soledad Valley. Coastal sage woodland on south side.
20. Penasquitos. Coastal sage on east and north side. Coastal forest on south side, city owned property.
21. Orest Canyon. Chaparral.
22. Del Mar Canyon. Chaparral.
23. Torrey Pines Reserve and Proposed Extension. Coastal forest. State Reserve with 280 acres of marshland proposed for acquisition with funds from 1974 Bond issue.
24. Mt. Soledad. Coastal sage.
25. Tecolote Canyon. Coastal sage.
26. Fort Rosecrans. Coastal sage.
27. Cabrillo National Monument. Coastal sage. Currently an 87 acre U.S. Department of Interior Reserve with 54.9 additional acres of Navy surplus land proposed for acquisition pending Congressional approval.
28. Kendall Frost Reserve (Mission Bay). University of California Reserve.
29. U.S. Navy Radio Station (Silver Strand). Beach strand.
30. Sweetwater Riverbed. Riparian.
31. Paradise Creekbed. Riparian.
32. Otay Riverbed. Riparian.
33. Border Field, Land Surrounding Tia Juana Estuary. Grassland. Currently being examined by the U.S. Bureau of Sports Fisheries for environmental impact of proposed state park.

SAN DIEGO COAST PLAN MAP SUPPLEMENTAL NOTES

COASTAL SITES OF REGIONAL SIGNIFICANCE

* SPECIAL STUDY AREAS

○ Natural Resource/Productive Resource Area

1. San Mateo Marsh
2. Las Flores Marsh
3. Santa Margarita Marsh
4. San Luis Rey River Mouth
5. Loma Alta Slough
6. Buena Vista Lagoon
7. Agua Hedionda Lagoon
8. Oceanside/Carlsbad
Agricultural Lands
9. Batiquitos Lagoon
10. San Elijo Lagoon
11. San Dieguito Lagoon
12. Los Penasquitos Lagoon
13. San Diego River Mouth
14. Famosa Street Slough
15. Sweetwater Marsh Complex
16. South Bay Salt Ponds
17. Tia Juana Estuary

○ Urban Areas

1. Oceanside Harbor/Strand
2. Carlsbad CBD/Transition Area
3. Leucadia/Encinitas Business Districts
4. San Dieguito Communities (Bluff Top
Portions)
5. Cardiff Duplex Transition Area
6. Solana Beach Business District
7. Old Hotel Del Mar Site
8. Carmel Valley Road adjacent hillsides
9. La Jolla/La Jolla Shores
10. Pacific Beach
11. Mission Beach
12. Ocean Beach
13. San Diego Bay Front (corresponds with
Port District study areas) of Special
Interest:
 - Navy Field
 - Embarcadero
 - Glorietta Bay
 - Shelter/Harbor Island
14. Barrio Lagoon
15. Imperial Beach Redevelopment Area

* Recreation Areas

1. Del Mar Bluffs (potential for linear
park)
2. Torrey Pines City Park (resolution
of use conflicts)
3. Ladera Street Park (access)
4. Mission Bay

△ PRIORITY ACQUISITION SITES [of title or
public use rights] (from north to south;
does not reflect priority)
In wetland areas, potential existence of
public trust doctrine shall be investigated
prior to acquisition.

1. San Luis Rey River Marsh
2. Area surrounding Buena Vista Lagoon
3. Area surrounding Agua Hedionda Lagoon
4. Encina Power Plant Beach Front
5. South Carlsbad State Beach (extension
to north and south)
6. Batiquitos Lagoon and surrounding area
7. Area between Sea Cliff County Park and
San Elijo State Beach
8. San Elijo Lagoon and surrounding area
9. Area between San Elijo State Beach and
Cardiff State Beach (State Park Bond
proposed acquisition)
10. San Dieguito Lagoon and surrounding
area (excluding race track)
11. Los Penasquitos Lagoon and surrounding
area (portion proposed for State Park
Bond acquisition)
12. Sweetwater Marsh complex
13. Tia Juana Estuary (portion proposed for
State Park Bond acquisition)

□ Contingency Areas (public lands when de-
clared surplus)

1. Camp Pendleton
2. Naval Electronics Lab, Coast Guard,
Fort Rosecrans
3. Lindbergh Field, Marine Corps Recruit
Depot, Naval Training Center
4. North Island
5. San Diego Naval Station
6. Ream Field

* SUBREGIONS

1. Pendleton Coast
2. Oceanside
3. Carlsbad
4. San Dieguito: Leucadia, Encinitas,
Cardiff, Solana Beach
5. Del Mar
6. Torrey Pines/La Jolla
7. Pacific Beach, Mission Beach, Ocean
Beach, Mission Bay
8. Point Loma/North Island
9. San Diego City Bayfront
10. Coronado/Silver Strand
11. South San Diego Bay
12. Imperial Beach/Tia Juana River Valley

